THE LIBRARY OF CONGRESS,
Two Copies Received
FEB 3 1903
Copyright Entry
CLASS XXc. No.
COPY

THE AUTOMOBILE

WEEKLY — NEW YORK — SATURDAY, FEBRUARY 7, 1903 — CHICAGO — 10 CENTS

Foreign Automobile Periodicals.

TAKING the number of journals published in each country as an indication of the popularity of mechanical vehicles and the life of the movement, France is far in the lead, followed by Great Britain, Germany, the United States, Belgium, Italy and Austria, in the order named. Russia, Sweden-Norway, Spain and Holland show traces of popular interest through bicycle publications paying more or less attention to automobile matters, and outside of Europe, Australia, Argentina and British East India follow in the same class. If, however, the nature of the various publications is also considered, it becomes more

GROUP OF LEADING FOREIGN DAILY, WEEKLY AND MONTHLY PUBLICATIONS PRINTED IN VARIOUS LANGUAGES.

difficult to draw conclusions. The French press is rich in journals devoted to the sport, but does not pretend to lead the automobile industry on technical questions. It seldom goes beyond the information supplied it by constructors who are actively engaged in building automobiles, but on the other hand these constructors are so busy with experiments and give the results of them so freely to the press, that the mere reporting of the work done in factories and laboratories easily fills the pages and furnishes plenty of food for reflection.

As a matter of fact only one French journal aims at a thorough analysis of motor vehicle mechanics, two or three dabble in this branch of information, while a host of others attract the public's attention mainly by vivid descriptions of events and profuse illustration. Two daily sporting papers, *Le Vélo* and *L'Auto Vélo* (the latter now enjoined from using the word Vélo in its title), keep the Parisian sportsmen informed, and take a leading part in organizing races and contests. But during the past year the French Government, through the Ministers of War and Agriculture, has spoiled this activity somewhat by holding races and contests under its own supervision, mainly with a view to encouraging the employment of alcohol and benzol mixtures instead of gasoline (benzine), and it placed these contests on an elaborately scientific basis, which it was beyond the resources of the publications to imitate. Outside of Paris the French automobile press is inconsiderable, the only important provincial paper being one published at Nice and supported by the rich, cosmopolitan winter population of the Riviera district. Another publication which owes its existence to the great number of native and foreign travelers who spend their leisure days on the roads of France, is that of the French Touring Club, which is a sort of good roads magazine that originated with the bicycle and has grown more important with the automobile.

THE BRITISH PRESS.

The complexion of the British press is quite different. Its scope is more comprehensive, its information more thorough and varied, its aim at instructiveness more serious. It owes its strength mainly to the fact that the British automobile industry falls far short of supplying the British demand, and hence the industries of France, Belgium, Germany and the United States all patronize its advertising columns. Vacillating between a thorough appreciation of this fact and patriotic impulses the English automobile journal is international and insular by turns, and the recipient of a great deal of valuable information. Owing to the prominence of utility vehicles in the estimation of the British and the legal impossibility of races on British soil, there is a closer union between the automobile press and the general engineering press than in any other country, but, curiously enough, the fruits of this union have not so far appeared in the road vehicles of English manufacture, suggesting perhaps that art and intuition have more to do with the advancement of the popular side of automobilism than scientific discussions. The *Autocar* and the *Automotor* are the most serious-minded among the publications, while the *Motor Car Journal*, the Irish *Motor News*, and *The Motor World*, are bright representatives of the lighter class. At two extremes of the possibilities in automobile journalism Great Britain presents examples of what may be done to reach subclasses of automobilists. *The Car* is an ultra-fashionable weekly, edited by a member of Parliament who is a friend of King Edward, a baron in innumerable generations and a very good all-around sportsman. It yields nothing to any publication in typographical appearance, but is meagre, though reliable, in facts. At the other extreme *Motor Cycling* caters exclusively to the devotees of the motor-driven bicycle and in this field covers mechanics, sport and humor in a style as British as that of *Punch*.

GERMAN AUTOMOBILE PAPERS.

Germany has so far starved its automobile press, and in this remark Austria is included. The German journals and the German manufacturers have stood apart in a manner detrimental to both. Their best articles are those contributed by professors at the polytechnical colleges who have thrown themselves in the breach to clear up the exact value of construction systems. Usually each issue of a German paper contains one such, mainly theoretical, article, while the rest is borrowed from English, French and American contemporaries or given over to *Vereins-Nachrichten* (club-work schedules). On the humorous—or pseudo-humorous—side of automobilism *Das Schnauferl*, a Bavarian publication in the style of *Fliegende Blaetter*, leads the world. It has absolutely nothing serious to say about automobiles, but is very well patronized and its comic illustrations are extensively copied. The German combined bicycle and automobile journals lead a precarious life, more than modest in typography, contents and influence, but lately signs have appeared of greater ambition in purely automobile journalism. The *Automobil-Welt* is patterned after British and French journals.

ITALIAN PUBLICATIONS.

Italian papers, such as *La Stampa Sportiva* and *L'Auto*, deal with the sport, almost exclusively, in text and pictures, while the Italian Touring Club of Milano publishes a series of traveling guides with excellent maps for the convenience of tourists of all nationalities, whose great number renders this enterprise financially feasible.

All considered, the journalistic work to which the automobile movement has given rise, while not unexceptionable in quality, is undoubtedly greater as a factor in public education and the spread of general knowledge of civilizing influence, than that born of any other modern movement. Comparable in intensity and volume only to the religious agitations of the past, militant automobilism has invaded all fields of literature and journalism, and the student of its various phases cannot help being impressed with the absolute certainty of its victory over all hostile factors, whether they appear in transitory public opinions, in judicial decisions or in short-sighted legislative interference with the natural course of events.

What's in a Name?

King of Belgium, King of the Belgians, Roi du Belge, Roi de Belge, Roi de Belges; these are the various styles of the name under which manufacturers have exhibited the sumptuous style of tonneau car with individual front seats, which is known as the Roi des Belges car in Paris, in honor of Leopold, King of the Belgians, who first had this style of car made. If the direct translation, "King of the Belgians," is found awkward as the name of a style, and the original French term is preferred, only one form is admissible and that "Roi des Belges," but if it is preferred to Anglicize it with a pronounciation somewhat similar to that of the original, we might write it Rardeybellsh or Wardeybellsh, on the same principle by which "Dent de Lion" was changed into our common "dandelion," but "du Belge" or "de Belge" or "de Belges" renders neither the sound or the grammar of the phrase.

A Business Pioneer.

The exhibit of the Steam Carriage and Boiler Company of Oswego, was the only one at the Show managed by a woman, and well managed at that, in spite of the severely mechanical character. Miss McCarthy, who has been the actual business manager of this company since the death of C. A. Kitts, has proved her ability as an executor as well as in the sales department, and handles the mechanical details of the product with a skill that promises well for the interest of womankind in automobilism in general.

No Appeal in the Marble Case.

NEW HAVEN, Conn., Jan. 26.—It is stated in the office of the Clerk of the Superior Court for New Haven county, that no appeal will be taken in the case of Herbert A. Marble, charged with manslaughter. Marble ran an automobile into a team driven by John Molz last summer. Molz died later, and Marble, who was a New Yorker, is now serving a sentence of a year in jail. His time will have expired by the latter part of next summer.

Friction Disk Driven Motor Vehicles.

At the Madison Square Garden Show one distinct type of automobile was noticed only by its conspicuous absence. This was the friction-driven gasoline vehicle. Under this name might be included the belt-driven car, which now, since Benz abandoned the belt, has only one prominent representative among the manufacturers of the world, namely, Fouillaron, of France, who drives with a special belt of triangular cross-section running over two expansible and contractable pulleys which produce all variations in the speed ratio of the power transmission by the relative changes in dimensions of which they are susceptible. But the present article is not concerned with belt-drives in any form, taking for its subject only the friction-drives by which power is transmitted from one revolving disk—the driver—to one or more driven disks, usually operated at right angles with the driver disk. By a short, expressive term this is known as the discus-system.

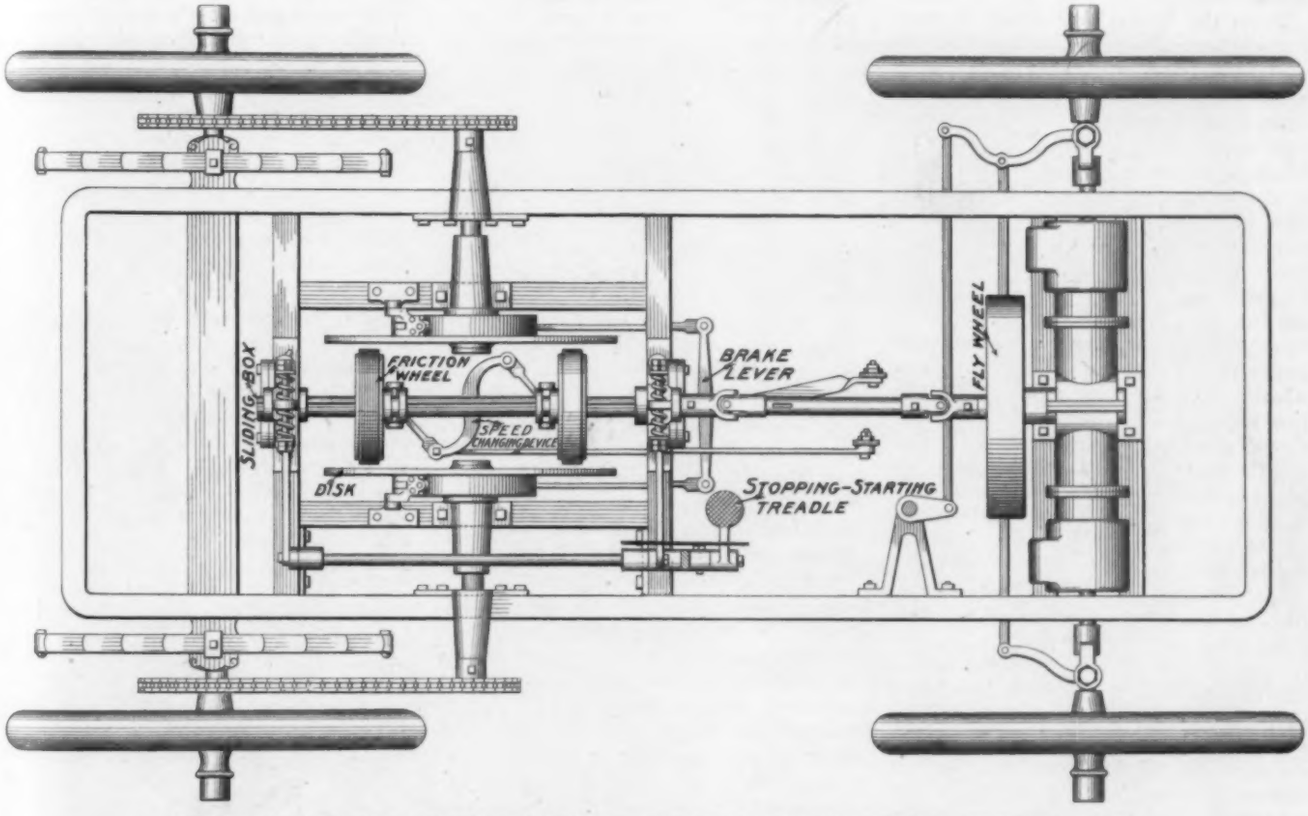
With several modifications it is represented in this country by the Chicago Motor Vehicle Company; the Friedman Automobile Company, also of Chicago; the Union Automobile Company, of Union City, Ind., whose president, Mr. Lambert, is also the chief of the Buckeye Manufacturing Company, of Anderson, Ind.; the Burt Manufacturing Co., of Kalamazoo, Mich., and the Marble-Swift Automobile Company, of Chicago.

A large eastern manufacturing firm, not so far identified with automobilism and not quite ready to enter the market, is also contemplating the employment of this power transmission system.

In point of numbers the believers in the discus drive—within the American automobile industry—are evidently entitled to as much consideration by the public as any other school of constructors operating on lines independent of the generally accepted practice and theories.

A vigorous European defender of the discus system has appeared, moreover, in Nuremberg, Germany, where the Union-Maurer Company produces five or six styles of vehicles, from light pleasure cars to very heavy drays, all operated on this principle.

Some consideration of its practical forms and theoretical peculiarities would therefore seem to be timely, and is given in the following. So as to be quite definite, there is first presented an illustrated description of the system as it has been applied by one American manufacturer. The accompanying engraving shows plainly the few mechanical elements by which this vehicle is propelled. The motor, formed of two opposed horizontal cylinders, is mounted directly over the front axle and rotates the motor shaft, to which is attached the flywheel in the usual manner. In most other discus-drive machines the flywheel serves as the driving disk, and the driven disk, or disks, impinges directly against it, while the speed variations are obtained by sliding the driven disk across the diameter of the flywheel, getting high speed when the driven disk is near the periphery, low speed when near the center and reverse when beyond the center. As will be seen later, this arrangement, while quite simple, has several important disadvantages, and especially this that the driving is weakest on the slow speed where frequently the greatest power is required. That is to say, the discus-driving system gives the greatest percentage of loss when the driving surface moves slowly and when the difference in speed between its inner edge and its outer edge is considerable. Suppose, for example, that the driven disk is slid toward the center of the flywheel, so that its inner edge is exactly at the center, while the outer edge is 1 1-2 inch—the width of the disk—removed. Then no motion whatever is communicated to the innner edge, while the outer edge is driven at the rate of about 9 1-2 inches for each revolution of the flywheel. In this conflict between driving speeds at two points in fixed relations to one another, there is naturally a great loss of power, and what this loss amounts to will be seen more clearly in the theoretical discussion.



CHASSIS OF FRICTION DRIVEN AUTOMOBILE, GIVING HIGHEST EFFICIENCY AT SLOW SPEED.

In the machine shown in the engraving this drawback has been avoided completely by reversing the conditions, so that the mechanism operates to best advantage at slow vehicle speed when the power to pull the load (climb the hill) may be in question, and the sacrifice of power incidental to the system (as so far devolped), is made at high vehicle speed, meaning only a reduced speed capacity, but nothing which might detract from the vehicle's ability to perform its work at one speed or another.

More than incidentally, the same rearrangement of the mechanical elements obviates the excessive wear of friction surfaces which was one of the disadvantages in the early forms of the system, and which occurred mostly when the tractive effort was great and the vehicle speed small.

From the flywheel the power is transmitted through a shaft provided with two universal joints connected to another shaft carrying two adjustable driving disks or friction wheels. Sliding boxes at both ends of the latter shaft contain the bearings in which it revolves and permit it to be turned slightly to either side. Before this dislocation of the two sliding boxes is brought about—by means of a lever—the friction-wheel shaft is in prolongation of the universal-joint shaft and the friction wheels all but touch the two large driven disks which communicate power to the chains which drive the rear wheels. The simultaneous motion of the two sliding boxes in opposite directions throws one friction wheel against one disk and the other against the disk on the opposite side, the motion required being very small, so that little power is lost in taking up the misalignment of the two shafts in the universal joints.

A speed-changing lever controls the two friction wheels, causing them to slide along a keyway in their shaft in a manner readily understood from the illustration. The two wheels are by this device always equi-distant from the axis of the driven disks, so that the two disks will receive the same power and speed at any given adjustment of the friction wheels. When the friction wheels are farthest apart they drive the disks at their outer edges producing the greatest possible speed reduction, and when closer together the speed is proportionately increased. Being on opposite sides of the axis of the disks and working, one with its left side and the other with its right side, or one downward and the other upward, the friction wheels turn the two disks in the same direction. But this direction can be reversed by throwing the sliding boxes the opposite way by means of the starting lever, which is thus also a reversing lever. This causes the wheel which before engaged the left disk to engage the one to the right and *vice versa*.

In what particular manner the sliding journals accommodate themselves to the slight angular motion of the shaft has not been made known to the writer, but it can be readily seen that a bearing formed of a single row of large balls would allow such a slight turn of the shaft as the one in question, or the journal boxes might have some play on their slides so as to turn with the shaft.

In the machine shown in the engrav- into good contact with the disks, they are keyed loosely on their shaft. If they were keyed very rigidly they would engage the driven disks with one edge only, namely, the one farthest from the axis of the disks, instead of with the whole width of their periphery; but the fixed spline in the hubs of the friction wheels has some play in the keyway. When the wheels are pressed against their respective disks, their peripheries will therefore accommodate themselves to the surfaoe of the disks and, when rotated, will wobble slightly on their shaft. In effect this is equivalent to coning their peripheral surface so as to offset the angle between the shaft and the driven disks, but the wobbling arrangement has the advantage of accommodating itself to any adjustment of the friction wheels in relation to the disks, while coned wheels would fit only one, because a greater turn of the shaft is required to bring the wheels and disks in contact at the high-speed adjustment, when the wheels are close together, than at the low-speed adjustment when they drive the disks near the peripheries of the latter.

The friction surfaces of the wheels are coated with fiber, while the disks are plain cast iron, this choice of durable materials, rather than leather surfaces, being made possible by the small pressure required for obtaining sufficient friction when the hardest driving is done at the outer edge of the disk. The wobbling motion of the friction wheels by keeping their fiber surfaces in perfect contact with the plane of the disks, also keeps them perfectly round and cylindrical.

It will be noticed in the drawing that no provision is made for compensating gears, and it is one of the claims advanced for the construction that the driving means allow sufficient slip to dispense with this complication.

The shaft bearings of the two disks are wide and substantial so as to absorb the side pressure caused by driving each of the disks on one side only.

Aside from the total elimination of gear wheels in this construction of an automobile and the great reduction in cost of production resulting therefrom, the main advantages aimed at are simplicity of operation, easy starting and stopping, the possibility of operating the motor at constant velocity, noiselessness and the avoidance of the cone clutch usually employed for connecting the fly wheel with the transmission gear. While a double emergency brake is fitted to the rear wheels of the vehicle (acting on the disk shafts) the method ordinarily used for braking the machine consists in reversing by the starting and reversing lever. The change-speed lever and steering wheel are operated by hand, the sliding boxes by a pedal. The friction wheels and disks are enclosed in dust-proof casing.

Under the supposition that the discus system loses no more power in transmission than the sliding gears or clutch gears commonly in use in automobiles, it appeals strongly to the manufacturer who desires to build a strong vehicle at low cost and moderate weight, as the system has few parts liable to break or get out of order, and the ordinary wear of the friction wheel surfaces does not interfere seriously with operation, besides that these wheels may be readily replaced when worn out by workmen of ordinary skill or the owner himself. Compared with the modern gasoline vehicle in which a high-powered motor permits the vehicle to be driven mostly on the high gear, so as to avoid operation of the mechanical gears, the discus system seems to present a wider range of power, if not in theory at least in practice. That is, while the operator of the standard-geared gasoline vehicle only reluctantly falls back on his low gear, the operator of the discus vehicle naturally effects all necessary power changes by sliding the friction wheels into the best position while leaving the motor run at the speed and power development for which it is best adapted. He may ordinarily expect to be able to run a whole day without throttling or accelerating the motor or changing the spark, if he so chooses, but in emergencies may fall back on motor control, as operators of other vehicles fall back on the low gear. Which is preferable from the the driver's standpoint seems to be largely a question of the skill he possesses. The best results and the least vibration should, however, be obtained in both systems by developing little more power in the motor than is used in the propulsive effort, and the acceptance of that principle leaves as the main advantage in the discus system the continuity of the mechanical speed changes merging into each other by insensible gradations and being effected without brusque physical effort, as of clash gears or hard-working clutches. Modern improvements in clutch and sliding gears reduce these advantages, which at one time, not very far removed, would have seemed highly important, to a matter of less absolute preference, but at all events there remains for the discus drive the simplicity and cheapness of construction with all that this implies.

As to the mechanical efficiency of the discus system ,it depends on a number of factors, among which are: the width of the driving wheel's friction surface, the material of the surfaces, the speed of rotation, the ratios of speed reduction at

varying adjustments. The bearings throughout the mechanism are, of course, also of importance, and, in the construction specially shown in this article, the workmanship of the universal joints in the driving shaft should be of the best, but these last-mentioned factors are not special for the discus system. Power is transmitted by jointed shafts in many other automobiles without serious consideration of the power losses involved. The rear driving axle in some of the De Dion et Bouton machines are of this construction and may be especially referred to, because the universal joints in them are always in action when the vehicle is driven, and do not merely serve the purpose of avoiding strains in cases of exceptional torsion. Even in vehicles of the Renault type every jolt which actuates the vehicle springs also takes effect in the joints of the driving shaft, causing them to operate at varying angles.

All that needs to be specially examined in the discus system is therefore the power lost by sliding and rolling friction between the power transmission elements.

The mathematical discussion of this point is somewhat complicated by reason of the unavoidable variation to which all the factors are subject when vehicle driving is considered. The most reliable data have reference mostly to the use of cast iron friction wheels acted upon by a leather-faced disk. By the use of fibre, compressed paper and other materials the friction coefficients which have been considered in these calculations become inapplicable, and therewith also the working pressures figured as necessary between disk and wheel. In a general way the formula is advanced with relation to the width of the wheel surface that it should equal the working pressure divided by the coefficient of friction, but in an automobile the necessary working pressure changes with the load and the gradient of the road. It also changes with the radial distance from the center of the disk at which the wheel works.

The smallest loss in transmission would be had with a wheel of infinitely small width, but, on the other hand, a narrow wheel would be subject to greater pressure per square inch than a wider one, and would therefore wear faster from this cause. The broader wheel would wear more by reason of slip on the disk, but a certain width is required for strength. The constructor is therefore between two evils and must make his choice mostly from practical experience. With a constant adjustment of the mechanism the friction loss is found to be proportionate to the power transmitted. When the pressure between the elements is kept constant, irrespective of the work required, the friction loss is much increased beyond what it would be if the pressure were always held down to its minimum, and this would show the importance of regulating the pressure on the sliding journals (in the construction described), according to the amount of power needed for propulsion. This is especially the case when a broad wheel is used and is applied near the axis of the disk. The losses then reach figures exceeding any that would be suffered with gear transmission, according to calculations by Docent Lutz at the Technological Institute in Aachen, Germany. The same authority on this subject shows that cast iron on cast iron shows less friction loss than leather on cast iron, and that the losses are much smaller the larger

CAR AND DRIVING MECHANISM (ON END) OF THE KNOX AIR COOLED SYSTEM AT THE GARDEN SHOW.

the diameter of the friction path on the disk. The inferences to be drawn from these laws applying to the system seem to favor a narrow-friction wheel of moderate diameter, adjustable pressure and hard-wearing surfaces, and also indicate that it would be inadvisable, with the construction here described, to attempt high vehicle speed. As an example illustrating the range of friction losses Mr. Lutz figures that a 12 H. P. machine with leather and cast iron drive loses 1.78 H. P. when going at minimum vehicle speed (motor speed constant at 900 r. p. m.) with a narrow friction wheel (width calculated for small driving-pressure), but only 0.53 H. P. at maximum vehicle speed with the same friction wheel.

[This has reference to the construction in which the flywheel drives the discus wheel, but would apply to the construction here described by reading maximum vehicle speed for minimum speed and *vice versa*.]

The same machine fitted with a broad discus wheel, calculated for maximum pressure, shows a loss of 5.75 H. P. at minimum speed and only 1.74 H. P. at maximum speed. The percentage of loss thus varies from 14.5 per cent. of the driving power to 48 per cent., according to variations in width of discus, its adjustment (which means low or high speed) and the pressure applied between the friction elements. This is with leather and cast iron surfaces.

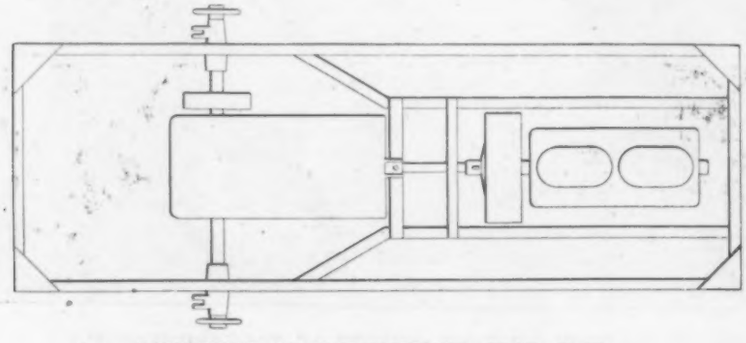
The losses from rolling friction are comparatively insignificant, amounting to only 3 to 4 per cent. at slow speeds, but rising to 10 per cent. at high speed. This also should be reversed for the construction specially described in this article.

While modifications in construction would suggest many other considerations of the discus system, it will already have been made clear that its practicability and efficiency in general depend very largely on the manner in which it is carried out, the general design, the choice of dimensions and materials and the adaptation of the construction in each instance, for the work for which the vehicle is intended.

Foreign Cars at the New York Show.

Scattered about the Garden, among the home exhibits, there was a sprinkling of foreign production, including both finished cars and bodies, and, also, in several instances a complete chassis was exhibited.

Among the purely French cars, a new Panhard 15 H. P. *chassis* and one of the American C. G. V.—which may as well be classed with the French cars—were noticeable. They were alike in some respects. Both had armored wood frames, the armoring consisting of a thin flitch plate, cut in girder shape and with the sloping top edge bent over in a narrow flange, riveted to the inner face of the wood. Neither machine used the now common loose coupling or universal joint between the engine and clutch shafts, to prevent cramping of these members in their bearings. Neither did they dispense altogether with the false frame, which in the C. G. V. car was of fairly substantial build. Both had the usual four speed sliding gears, without the direct drive feature, and with all the speeds operated in series by one lever. Their details, however, differed considerably.



SUSPENSION OF NEW PANHARD GEAR CASE.

The Panhard car was especially noticeable for the unusual method of supporting the gear case. The false frame supported only the engine and the front end of the gear case, the latter by a single lug in the middle, back of which the frame widened out and slanted upward to meet the sills of the main frame. The back end of the gear case was supported by the countershaft itself, which appeared to be quite stiff and which turned in long bearings in cast steel boxes bolted to the bottom of the side sills. These boxes were provided with seats slightly rounded, though not spherical in contour, and the expectation appeared to be that they would accommodate themselves to the direction of the countershaft when the frame was twisted. This gave the gear box a three-point support, the forward point being evidently intended to be constantly aligned with the engine shaft by being supported on the same false frame. The lower gear shaft, or "clutch shaft," as it is often called, projected straight out from the gear box and the front end had a short bearing in the center of the flywheel. The male portion of the clutch, instead of being keyed to this shaft, was slightly loose on it and was held in place by a key passing clear through the shaft and through the hub of the clutch. The key slot in the shaft was elongated so that the clutch portion could slip back and forth on the shaft without rotating on it; and this shifting, by which the clutch was engaged and disengaged, was accomplished by a rod passing centrally through the shaft, and connected by some sort of a collar bearing to a rod coming out at the back end. An adjustable flanged nut was threaded on the rear end of this latter rod, and was acted on by a pair of fingers from a rock shaft to disengage the clutch. The spring by which the clutch was normally engaged was inside the gear box, and the elimination by these means of all mechanism between the clutch and gear box gave the whole an appearance of striking simplicity. To relieve the key above mentioned of the main part of its duty, a sort of two-armed spider was keyed to the end of the shaft inside the clutch. Each arm of this spider was provided with a hole in which worked horizontally a pin projecting from the clutch portion. As these pins and the clutch hub were both slightly loose it is to be inferred that the maker expected a small amount of play between the engine shaft and clutch, and intended that the latter should find its own center in the flywheel regardless of the shaft.

The steering column in this Panhard machine terminated at its base in a casting bolted to one member of the false frame. In the lateral direction this appeared to be very springy indeed, as it was not braced in any way; but naturally it had all the rigidity necessary in the fore and aft direction. This fact would go to indicate that the makers did not consider absolute rigidity of this false frame necessary to alignment of the shafts. A feature worth mentioning in this machine was the use of a sheet metal dust guard between the crank case of the engine and the sills of the main frame. It was provided at its lowest points with apertures for the escape of water. The tires of this machine are 870 millimetres (about 34 1-2 in.) in diameter, and the springs are about the same length, which certainly seems too short for dirt roads.

The C. G. V. chassis at the show had a combined throttle and hit and miss governor on the engine, but the writer was informed that it is the intention to use only the throttling governor on the regular machines. This governor, according to the makers, will be so arranged that it can be set to any speed desired, and will automatically open the throttle to its

fullest extent if necessary, to maintain this speed, as for instance in climbing hills. A feature of this machine is the use of two rack and pinion gears in series, a rack outside and another inside the gear box, and a shaft with two pinions connecting them, for shifting the gears. The purpose of this is to avoid the possibility of springing between the hand lever and the gears, which is sometimes found with less elaborate arrangements, and consequently the failure of the gears to mesh properly when the latch of the lever is in its notch. The platform rear springs of this machine, which are doubtless a material aid in reducing the springing of the main frame, and the water jacket around the vaporizer, by which any desired flow of water from the engine jacket may be used to warm the gasoline, are features already identified with this machine.

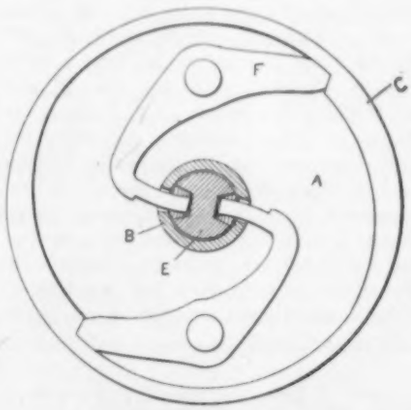
Following the lead of the Mercedes car, the stamped steel frame seems rapidly to be displacing the armored wood frame in France. The new models of three well-known machines—the Mors, Darracq and Clement—showed this construction, which, in the latter two, was employed in the false as well as the main frame. It certainly makes a very workmanlike construction, and unquestionably saves weight over the armored wood frame, as the steel frame, even in the heaviest cars, did not exceed 1-8 inch. in thickness. If this frame proves to have the resiliency of its predecessor it is only a question of time and of manufacturing in sufficient quantities, when it will be the only thing. The pressed steel frame, by the way, is displacing the tubular frame in a number of medium weight cars in France this year.

At both the Darracq and Clement stands were exhibited beautifully polished chassis with four cylinder motors, every part being lacquered or polished until it shone, and showing withal correct designs and careful attention to small details.

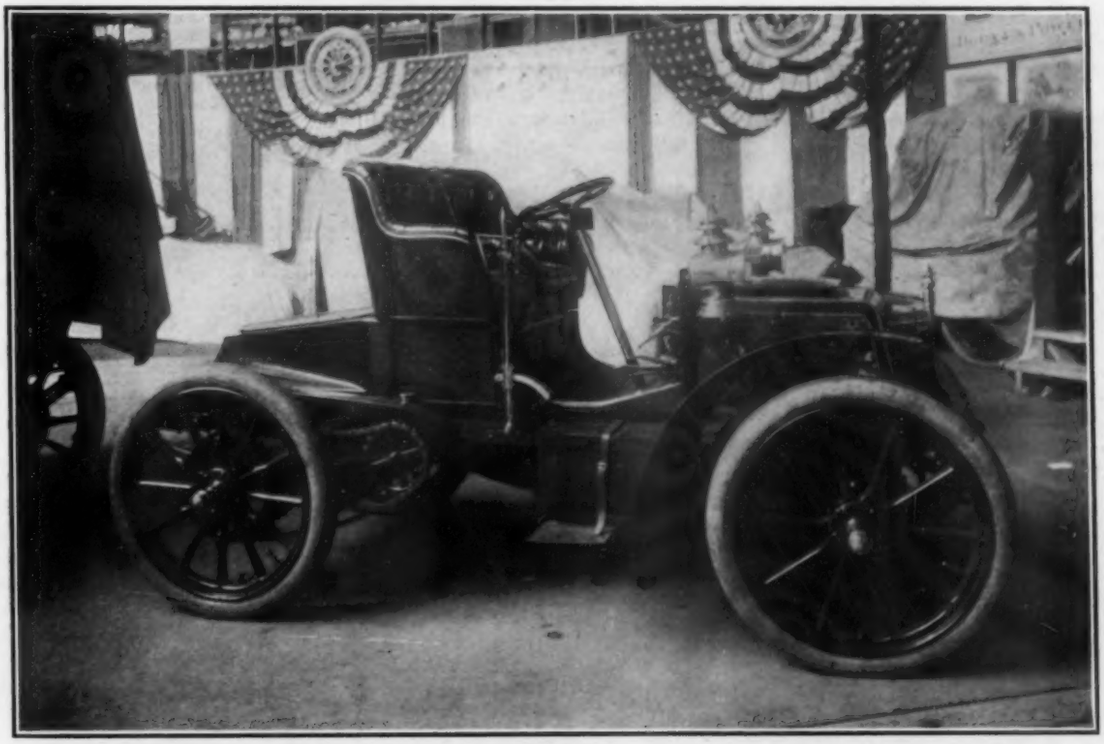
A feature in the latter car, however, which caused some criticism, was the arrangement of its propeller shaft, which has but one universal joint, placed next to the gear box. The rest of the shaft is incased in a large sleeve made fast to the case around the differential and bevel gears; and unless the single joint above mentioned combines the qualities of a cardan joint and an Oldham coupling, any lateral play of the axle, due to the yielding of the springs, cannot fail to cramp the shafts in their bearings.

The new Mors machine followed the Mercedes in discarding the false frame altogether and making both engine and gear box with wide-spreading feet bolted to the main frame. As in the Mercedes, the two shafts in the gear box lie side by side horizontally, and in a plane but little below that of the main frame, so that twisting of the main frame has but little effect on the alignment of the shafts. The transmission of this machine embodied the direct drive on the fourth speed which was illustrated in THE AUTOMOBILE October 4 last. Although this chassis did not have the "exhibition finish" of the two machines above mentioned, to the eye of the engineer it was certainly among the most satisfying at the show.

In the matter of transmission gears, direct drive on high speed is certainly gaining in popularity. Among others, it was noticed in the Darracq machines which have not previously had this feature. Another machine of considerable interest was a 24 H. P. Renault, claimed to be the identical one in which Marcel Renault won the Paris-Vienna race. Its gear box measured less than 12 inches from end to end of the bearings, and the body of it was hardly larger than a man's hat. It was an extraordinary illustration of the compactness possible with the Renault system of shifting the gears. Except for



FIAT INDIVIDUAL CLUTCHES.

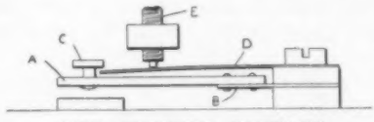


PANHARD CAR WITH BODY WEDGE SHAPED AT THE BACK, EXHIBITED AT MADISON SQUARE.

the engine being of another make, and for the body having a large tonneau, the 24 H. P. Ward Leonard machine was an exact copy of this Renault car.

For a European machine, the transmission gear of the Fiat car was something of a novelty. It had the customary pedal control and flywheel clutch, but instead of sliding the gears, each gear was made with a positive clutch attached to it of the form shown in the figure. The disk *A* is made fast to the shaft *B*, and the ring *C* turns loosely on *B* and is made fast to the gear. Mounted on pins in the disk *A* are two dogs *F*, backed by springs (not shown) which press them into engagement with the ratchet teeth in *C*. These dogs are disengaged by a central rod *E*, in which are recesses allowing only one pair dogs to engage *C* at one time.

An interesting improvement in spark coils, which was new to the writer, was seen on one of the Panhard cars, and was made by Basse & Michel under the name of "Nil Melior." The soft iron armature *A* is riveted to a copper spring *B*, and carries a stud *C* with a flat head which catches the end of the contact spring *D*.



"NIL MELIOR" CONTACT.

E is the contact screw, which is so adjusted that, when *A* is at rest, the end of *D* is as far as possible from the head of *C*. This allows *A* to gain velocity before the rupture of the circuit is accomplished, thus giving a stronger spark than would otherwise be produced.

Opening of the Cleveland Show.

First Automobile Exposition held in the Motor Car Manufacturing Center of the West Brings Together Many Interesting Exhibits.

Special Correspondence.

CLEVELAND, February 2.—The first automobile show ever held in this city, admittedly the center of the automobile manufacturing industry in the Western Hemisphere, was opened in Gray's Armory, on Bolivar street, to-night. A number of the exhibits were not yet in place, but the drill hall presented a lively and brilliant effect when the public was admitted. The roof was hung with long streamers of bunting, in the national colors, radiating from the center, while the arc lights shone down upon the various booths gaily draped in varicolored cheese cloth, gracefully rosetted and tufted and looped from railings and high frame work of scantlings. Riotous are the combinations of colors, from the pale pink and blue and white of the excellent Winton booth to red and green, and the funereal black of the Pittsburg Reduction Company.

Railings of 2 by 4 scantlings inclose all the booths interfering with convenient and close inspection of the vehicles, but the cars are there and the people came to see and admire. The aisles were comfortably filled and the people were of the interested class.

EXHIBITORS OF COMPLETE VEHICLES.

Nine of the twenty exhibitors of complete vehicles were unable to get their displays installed in time for the opening. These were the General Automobile Manufacturing Company, Rogers & Thatcher, Northern Manufacturing Company, Fredonia Manufacturing Company, Waltham Manufacturing Company, Ardmore Company, Kirk Manufacturing Company, H. B. Wick, and the E. R. Thomas Motor Company. Of the thirteen exhibitors of parts and sundries five were unprepared for the opening. This backwardness was not due to any procrastination or lack of energy on the part of the exhibitors, but must be laid at the doors of the railroad companies, as the congestion of freight in the yards made the unloading of exhibits from out of town very slow. The decorators were busy on the booths all day Sunday, and most of the spaces were ready for occupancy by Monday morning. The absentees to-night, who, however, expect to install their displays to-morrow, are the General Automobile Manufacturing Company, Rodgers & Thatcher, Northern Manufacturing Company, Waltham Manufacturing Company, Fredonia Manufacturing Company, Autocar Company, Kirk Manufacturing Company, H. B. Wick, E. R. Thomas Motor Company, Gray & Davis, B. F. Goodrich Company, John H. Graham Company, Post & Lester, and the Fish Tire and Rubber Company.

SOME OF THE ABSENTEES.

Other notable local absentees, who will not have any displays during the week, are the White Sewing Machine Company, Baker Motor Vehicle Company, and the Peerless Motor Car Company. As members of the National Association of Automobile Manufacturers, they deemed it advisable to stand by the decision of that organization to exhibit at only New York and Chicago. They were further influenced toward this decision by a feeling that the show would not be conducted with that equitable attention to the interests of all exhibitors that is requisite to the making of a real success of such an affair.

The White Company is soon to open a large new retail store in town, and fails to see the utility of displaying in a small booth at the armory when it can show its vehicles to better advantage in its own establishment in the Spring.

At the opening to-night there were a number of vehicles that are new to this territory and at least two that are new to the country at large. Of the latter are the new Geneva steam touring car and the Union friction drive car. New to Clevelanders also are the Olds tonneau and coupe and Toledo gasoline touring car.

The show is under the management of George Collister and Charles B. Shanks.

Following are brief descriptions of the exhibits at present installed:

GENEVA STEAM TONNEAU CAR.

Of the new vehicles on exhibition, which have never before been displayed, one of the most notable was a 10-horse power steam tonneau just completed by the Geneva Automobile & Mfg. Co., of Geneva, Ohio. This is a large, handsomely finished and comfortable car, which embraces a number of exclusive Geneva features and several others that are radical departures from the usual steam car construction, although not strictly new. Of the latter are the horizontal twin-cylinder engine direct connected by spur gear on the crank shaft to spur gear on the differential on the rear axle, similar to the Stanley construction for 1903, and the location of the boiler under the hood at the front, as in the Meteor steam tonneau shown at Madison Square Garden last month. Strictly Geneva are the semi-flash generator, the spiral coil burner and the kerosene vaporizer, for this is a kerosene burning machine.

The engine crank-shaft is enclosed with the differential in a casing which carries a quantity of oil for splash lubrication, and it is stated that an experimental car of this construction has been run 1,000 miles without repacking or lubrication. While the crank-shaft end of the engine is rigidly connected with the rear axle through the casing, the cylinder end is suspended from the body frame by a combination double hinge and pivot arrangement that allows the body to move vertically and laterally and to sway without affecting the engine. The engine has no link motion, but is reversed by means of valves operated through a sliding gear at the crank-shaft that is moved by a foot lever on the footboard.

The boiler is of a new type and consists of a series of coiled tubes disposed vertically side by side, their outer ends connected to a header at the top of the generator and their inner ends projecting

from the center of the coils downwardly to connect with a header extending transversely beneath the coil series. Thus the generator, while cylindrical in shape, lies horizontally across the front of the car instead of standing vertically, as most boilers do, and the flame from the burner rises between the coils. Water is automatically forced into the generator from the header below by means of a water pump driven by a rod actuated by an eccentric on the live axle. From this header the water rises to the centers of the coils, and, being converted into steam, circulates around the spirals and becomes superheated steam by the time it reaches the header at the top. From there it passes through a small steam pipe underneath the foot-board to the steam chest of the engine. No provision is made for preventing a reduction in temperature of the steam on its way, as it is considered an advantage to have it slightly cooled before it enters the cylinders. Exhaust steam from the engine is carried forward to a condenser, where the water is reclaimed. The condenser consists of a series of copper tubes flattened to about half their diameters and disposed transversely in vertical rows just back of the wire screen front of the hood.

The products of combustion are carried by down draft from the top of the generator downwardly and backwardly beneath the floor of the car through a rectangular sheet metal pipe of large area at the back of the boiler. Provision is made for freeing the pipes of the kerosene vaporizer of carbon deposits by blowing out with steam from the boiler after the fire has been turned out.

Connected with the same rod that operates the water feed pump from an eccentric on the rear axle is an oil pump for lubricating the throttle valves and the engine cylinders. The oil is admitted to the steam pipe ahead of the throttle valve, where it mixes with the steam, which is too hot and dry to be used without this admixture of oil. The oil reservoir is placed inside the hood at the front between the condenser and the top of the generator, where it is kept warm and fluid at all temperatures.

Water and fuel, either kerosene or gasoline, are carried respectively in 20- and 15-gallon tanks under the front seat, one filling of which is said to suffice for a run of 150 miles. Option is given on either kerosene or gasoline vaporizer.

Steering is by a tilting hand wheel, and attached to the steering post are the throttling lever and the fire and water shut-off. The by-pass valve to the generator is operated by a little hand wheel in the middle of the dashboard.

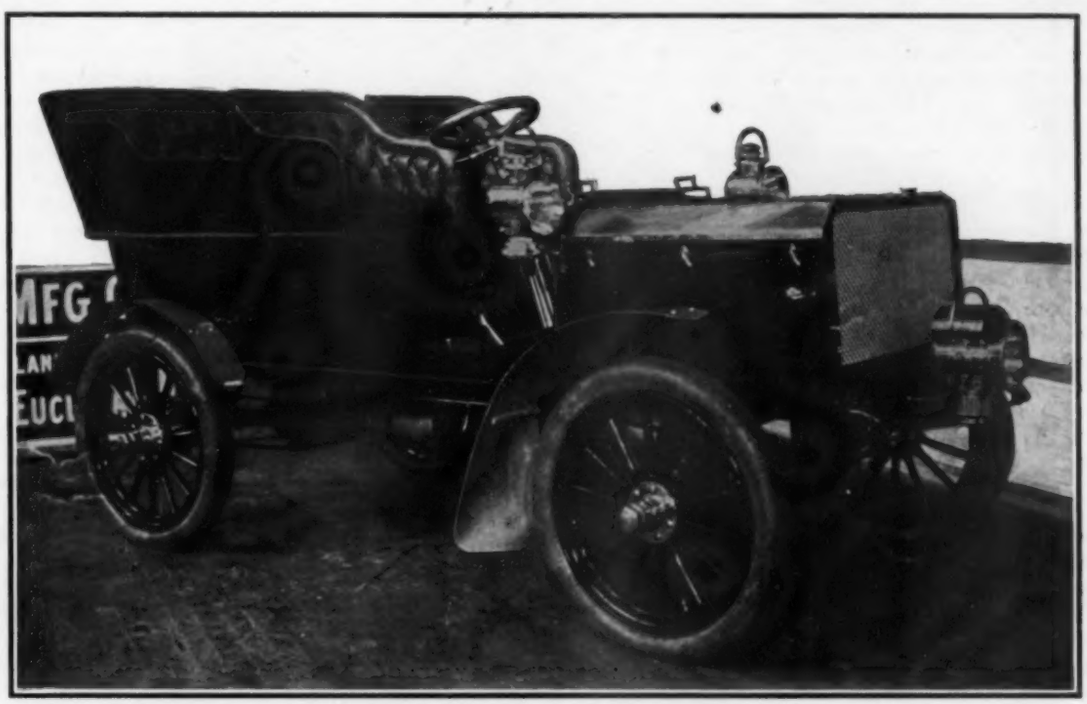
Expanding band brakes on the two rear wheels are actuated by a foot lever. A hand air pressure pump is located at the right of the foot-board, and the air tank is placed transversely back of the burner and just beneath the dash.

The body frame is of angle iron, suspended on semi-elliptic springs. The body is handsomely finished in automobile red and maroon and upholstered in buff and brown leather. Wheels are of the wood artillery type, 30 inches in diameter and fitted with 3½-inch detachable tires. The weight of the car, with tanks filled, is 1,600 pounds.

Another novelty at the Cleveland show is the two-passenger, friction-drive machine, made by the Union Automobile Co., Union City, Ind. Two of these machines are shown, of the same pattern. They were not brought into the Armory until late Monday evening, when hasty examination only was possible. They appear to be driven by a double opposed cylinder gasoline motor placed transversely at the extreme rear of the body, with the flywheel standing across the central line of the car. A sliding friction wheel contacts with the face of this flywheel at right angles. It is carried on a shaft hung in brackets from the frame under the seat. Drive is from a sprocket on the right end of this shaft by vertical chain to a larger sprocket carried on a short shaft that also carries a smaller sprocket and is journaled in a bracket depending from the frame. This smaller sprocket is connected with the large sprocket on the differential on the rear axle near the right hand end, so that there is a double reduction of speed. The water tank is in the back of the seat, of which it is apparently an integral part.

OLDSMOBILE EXHIBITS.

The Ohio Oldsmobile Company, organized just a short time ago, had a very interesting display of Olds machines, being practically the same as shown in New York with the exception of the runabout chassis. It consists of a handsome coupe, a touring car and a standard runabout, such as the Olds Motor Works has been manufacturing for the past year. The coupe is a great novelty for this part of the country, and attracted much attention. It has just been put on the market. The



PREMIER APPEARANCE OF THE GENEVA AUTO MFG. CO.'S STEAM TONNEAU BODY TOURING CAR.

touring car is also new with this company, but members of the Ohio company state that it is meeting with a good reception, their sales having amounted to more than a dozen within the last few days. All the machines shown are of 5 horsepower. The booth is handsomely decorated in red, yellow and white.

Foster & Co., of Cleveland, have on exhibition an Ajax electric runabout, shown in Cleveland for the first time. They are also displaying three of the General Automobile Company's gasoline machines. The engines are of the two-cylinder, balanced type, and are said to be normally equal to 8 horse-power. Two of these are runabouts, one with tonneau attachment and the other without. In addition they show the chassis of the machine. In all probability they will show two or three other vehicles provided they can get them in time. Foster & Co. are local agents for the General Automobile Company and the Ajax Automobile Company.

The Ohio Motor Car Company, of Cleveland, has a space just in front of the entrance to the Armory and is showing a large gasoline touring car made by the International Motor Car Company, of Toledo, and several runabouts made by the Northern Manufacturing Company will be put in position later in the week.

MISCELLANEOUS EXHIBITS.

The Diamond Rubber Company, of Akron, has a booth on the east side of the building, handsomely decorated in red and white. Both single tube and detachable tires are shown separately and attached to wheels of various makes. There are also cross sections, showing the thickness of the rubber and fabric and the manner of attaching to the rims. This company has just opened a branch store at 323 Huron street, with F. E. Taylor as manager.

The National Carbon Company, of Cleveland, is displaying its goods very much the same as at the New York show. The Rex closed circuit cell and open circuit cells are both shown, arranged on a series of graded shelves or steps. The booth is decorated with dark red in the form of a canopy and makes a very neat appearance with its carpeted floor and new furniture.

One of the most interesting displays is that of the aluminum castings of the Pittsburg Reduction Company. This concern makes everything in aluminum that can be used about an automobile, even to tonneaus and other attachments for the body of vehicles. This metal is largely used because of its lightness, for cases over the working parts of vehicles, and many of these castings are shown in the exhibit. Among these are parts used in the Stearns, Packard, Berg, International, Peerless, Winton and White. The company is showing a four-cylinder crankcase of aluminum and tonneau seats, hoods, crank boxes, gear cases and coverings for electric motors. The booth is trimmed in black to set off the white metal to the best advantage.

The D. E. Foote Rubber Co., Ohio representatives of the International A. & V. Tire Co., is showing a vulcanizer and all the molds for repairing tires up to five inches in diameter. It also has tires up to that size and a full line of bicycle tires. This firm makes a specialty of repair work of all kinds and conducts a large shop for that purpose.

The Kelley Handle Bar Company, of Cleveland, is showing a gasoline burner for steam machines which it is preparing to place in the market at once. This has a continuous coil of perforated steel tube with a cross tube below which is connected with the coil at each crossing, giving an even distribution of gas through the entire burner. There are no openings in the base of the burner, the air entering by down draught through "pockets" formed by a double wall at front and back, thereby preventing the back draught of flames through the bottom of the burner and outward past the sides of the carriage. The gasoline is vaporized in an S-shaped tube lying just above the burner coil. A new vaporizer is shown in connection with the burner. With this a small alcohol lamp is used to produce the first heat. It is claimed that this does away with smoke and flashing, which are sometimes attended with unpleasant results. This vaporizer and burner originated with the Geneva Automobile Company, whose patent has been taken over by the Kelley Company. The company is also showing its line of handle bars.

The New Departure Manufacturing Company, of Bristol, Conn., has on exhibition its line of bells and coaster brakes.

LOCAL AGENCY DISPLAY.

The Cleveland Automobile & Supply Company does not believe in doing things by halves, as is shown by the new home it is soon to occupy. No less is it shown by the space it occupies at the show—eight regular spaces, four in the automobile section and four at the side in which sundries are shown. The company is agent for Waverley, Locomobile, Searchmont, Studebaker and Columbia vehicles, of which it has fifteen of leading styles on exhibition. One of the most notable of these is a Waverley electric delivery wagon finished in white. The side spaces were taken up with a full line of supplies and accessories handled by the company. To make everything clear large signs have been placed about the spaces telling what make the machines are and what the different lines of supplies and accessories are intended for. The display is one of the most attractive in the building.

THE WINTON DISPLAY.

The Winton Motor Carriage Company occupies four spaces to the right of the entrance, and its display is attractive in every way. One of its magnificent touring cars occupies the center of the space and to one side is a chassis, placed over a large plate glass mirror in such a way that all the working parts of the machine are plainly brought to view. These are illuminated at night by incandescent electric lights beneath the chassis. The famous "Bullet" occupies a place of honor at the booth, but according to Mr. Winton it will be relegated to a back seat when the new racer emerges from that mysterious shop which was erected near the big factory some time ago. The space is decorated in pink, white and pale blue cheese cloth, and with palms and potted plants.

The F. B. Stearns Co., of Cleveland, has a display of three machines, a Stearns Suburban car, a single-cylinder tonneau and the châssis of a two-cylinder touring car. Red is the predominating tone of the display, the cars being finished in bright red, the railing draped in red and a large electric sign overhead bearing the word "Stearns" in red. The company contemplates making only 100 machines this year, most of which have already been sold.

The Shelby Motor Car Co., of Shelby, Ohio, brought its exhibit from New York to Cleveland direct, but on account of difficulty in getting cars into place the machines were not in position until late Monday evening. The display consists of a 20-horse power touring car and a combination two- and four-passenger gasoline vehicle.

GENERAL UTILITY CAR.

The Hoffman Automobile & Mfg. Co. presents its specialty, the "General Utility Car," with tonneau attachment—a single-cylinder 6-horse power gasoline machine. The steam machine, of which the company is now making a feature, is also shown. The Meade Cycle Co. has just been appointed Chicago agents for these machines.

The Elmore Manufacturing Co., of Clyde, Ohio, had an interesting display in charge of the Cleveland agent, Harry S. Moore. It is very much the same as the display at the New York show and consists of a tonneau and a 6-horse power runabout. These machines are equipped with double-cylinder motors of the two-cycle type, something quite unique in motor building. In addition to the complete machines Mr. Moore has on exhibition a motor of this type.

Rogers & Thatcher, who have only recently commenced business in Cleveland, had not gotten their new gasoline machine ready for exhibition Monday, but will have it in place later in the week. It is equipped with a four-cylinder gasoline engine hung vertically in front. The power is transmitted by bevel gear and the horse power is stated to be 35 actual.

The L. J. Mueller Co. is one of the supply houses in Cleveland that made a good

display of the goods handled, which consist of Hussey radiating coils, mufflers, pumps, steering wheels, Raymond brakes, Aultman radiators, Dayton compensating gears, sparking coils, chains, running gears, spark plugs and other goods of the kind.

Collister & Sayle, Cleveland, have on exhibit a large line of lamps, lifting jacks, hampers, bells, goggles and other goods used by automobile owners and operators. In addition they have taken advantage of the opportunity to exhibit sporting goods and bicycles. Their department is decorated in yellow and white.

WESTINGHOUSE ELECTRIC APPARATUS.

The Westinghouse Electric & Manufacturing Co. have arranged a fine exhibit of the electrical apparatus designed especially for use on automobiles. It consists of switches, motors and controllers in various styles and designs. One of the most interesting devices shown is an indicator attached to the dash which shows the condition of the battery.

The only speed indicator shown was by the Veeder Mfg. Co., of Hartford, Conn. Odometers attached to motors in operation attracted much attention also.

The Century Manufacturing Co., of New York, had a nice display of lamps. Brown velvet was used as a background, and it brought out the display in a very tasteful manner.

The B. F. Goodrich Co. had their booth tastefully decorated and their placards made up a background for the display of single tube, clincher and solid tires which the company manufactures.

Expert Discussion of the Oil-Engine Automobiles of 1902*—VII.

BY CAPT. C. C. LONGRIDGE.

It is a strange thing that no English firm appears capable of turning out motor-car axles of quality and accuracy equal to the production of French and Belgium firms. The Wolseley Company make their axles from Vicars special axle steel, but other leading firms import largely from foreign makers.

The employment of weldless steel-tube or hollow bored axles is the latest development and appears to have been taken from the French. In what seems the best method of manufacture, the axle is forged with certain outside enlargements, desired as re-inforcements in the interior. The forging is then bored from end to end. It is next heated and pressed in dies, which remove the enlargements from the outside and cause corresponding contractions of the bore at these places. The axle is then given the desired curve, hardened, tempered and finished in the lathe.

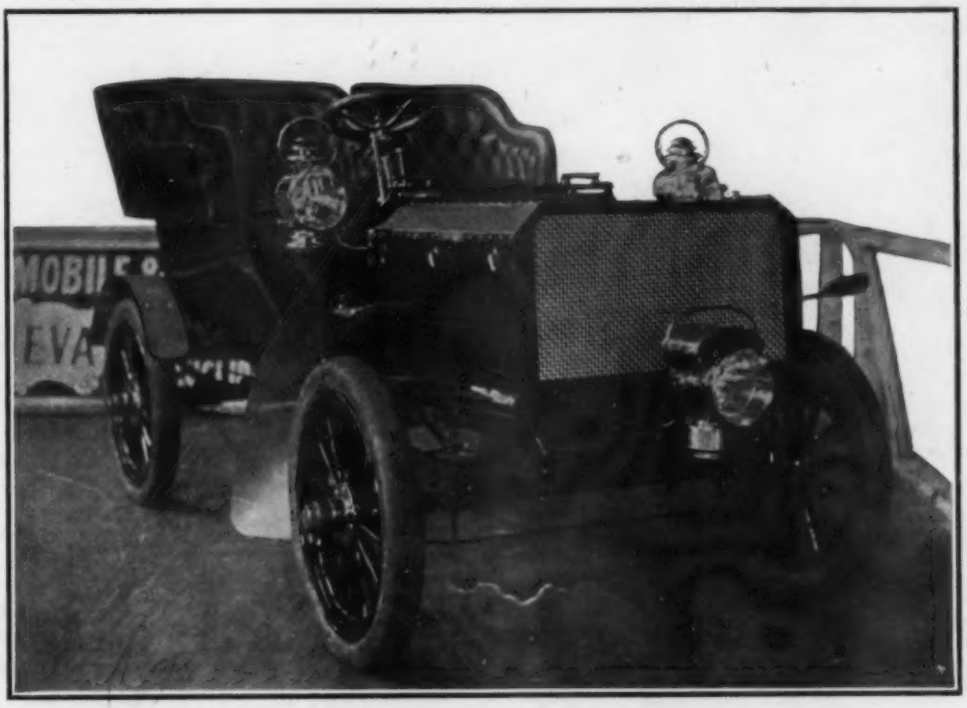
The same remark as to the superiority of the foreign made article applies to motor-car springs.

The firm of Lemoine et Cie. have a special reputation for such goods. For the purpose of more closely studying their process, the author visited their works, as also the Paris establishment of Messrs. Rothschild. Although naturally reticent, Messrs. Lemoine stated that the spring steel they used was a special brand made exclusively for their use by Messrs. Holtze, of Unieux, Dept. Loire, the metal containing manganese and a certain percentage of silica. Every spring was tested before delivery, and the tests witnessed by the author showed excellency both as to quality and make.

By far the majority of the springs used by French makers are of the Grasshopper type, fairly broad, flat and long. Length is a point on which both Messrs. Lemoine and Messrs. Rothschild lay stress.

Generally speaking, springs should not be less than one meter in length, preferably more. For light cars they should show when loaded a deflection of 15 to 30 mm. for every 100 kilos of dead weight. In heavy cars the deflection may be as low as 12 to 13 mm. per 100 kilos of dead load.

The customary method of application is to support the frame on springs; but in the Rothwell light car the body is carried by springs on the frame, and the vibration is said to be reduced. In a few cars a cross spring is added to the side springs, and this no doubt tends to break



FRONT VIEW OF THE NEW GENEVA STEAM TONNEAU-TYPE AUTOMOBILE.

*From a paper read before the Institution of Mechanical Engineers in London, England.

the periodicity or rhythm, which, occurring in any one system of springs, may accumulate to a disagreeable swaying.

Though not in use, numerous patents describe spiral springs for automobiles, and there seems no particular reason why they should not be employed, especially for heavy drays, etc.

With the object of saving the springs and preventing the wheels from jumping from the road at high speeds, pneumatic buffers form a new feature in the 80-horse power Mors car raced by Fournier in the

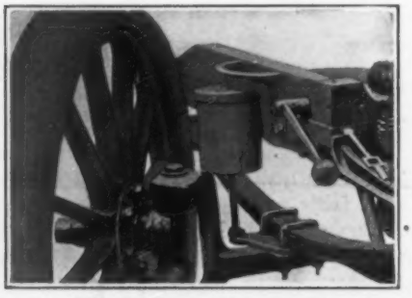


FIG. 1—MORS PNEUMATIC CUSHION.

late Gordon-Bennett Cup competition. A pneumatic cylinder is fixed to the frame, above each front spring, while the piston rod is attached to the axle, Fig. 1. Above each rear spring, two pneumatic cylinders or dash-pots are similarly fixed.

Endeavors have been made to save the motor also from jar by rubber suspension

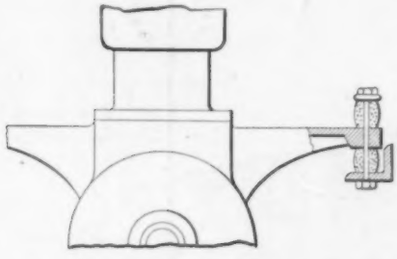


FIG. 2—RUBBER SUSPENSION BUFFERS.

buffers, as illustrated, Fig. 2. With a flexible drive and flexible pipe connections, the plan might be serviceable.

LUBRICATION.

In this respect, there is nothing very new or noteworthy. The innumerable toy grease-cups that used to adorn the mechanism of cars have been replaced mostly by sight drop-feed oil lubrication. In a few cases, the preferable forced or circulating pump lubrication is employed. In the Wilson and Pilcher car, this excellent system is used throughout, the oil being drained back, filtered and re-used. In the 35-horse power Mercedes car, lubrication of the engine, engine bearings and change-speed gear is provided by an oil pump, chain driven off the half-time shaft. In the 20-horse power Maudslay car, the engine shaft is extended forward, and by means of worm gear, drives two barrel pumps fixed on the frame. In both cases the oil returns to a reservoir and is filtered for re-use. All pumps, whether for oil or water circulation, should be gear driven.

Change-speed gears are generally run in oil; and crank-shaft lubrication is of the splash, collecting cup or ring type.

A very unusual method of crank lubrication in modern high-speed steam engines, is to fill the crank chamber with water to a depth covering half the crank-pin on the down stroke, floating oil on the top. This plan has two advantages. The churned oil and water furnish better and more ample lubrication than oil alone, while the gradual evaporation of the water prevents the temperature rising over 212 degrees Fahr. It would be worth trying the same plan for motor cranks. Provided, which with the piston fit and temperature does not seem likely, that water did not find its way into the combustion chamber, and that evaporation was not too rapid, the addition of water would not only improve lubrication, but very considerably cool the piston and cylinder walls, while at the same time providing a volume of lubricant enabling the engine to run safely should the oil supply temporarily fail. It is unnecessary to add that the crank chamber must communicate with the atmosphere by pipe or otherwise.

So far as the author knows, the Duryea car is the only make that sensibly provides oil-pad lubrication for the pins of the driving chains.

There is rather an interesting question as to the temperature which bearings may be allowed to attain for maximum efficiency. The following figures recorded in the "Uhland's Technical Rundschau" represents the result of certain German experiments. The running conditions remaining the same, the friction decreased with the increase of the bearing temperature, up to a certain point in the following proportions:

Temperature Cent.....	29°,	49°,	64°,	82°,	93°,	115°
Friction in lbs.....	8.0,	7.5,	6.0,	5.0,	6.5,	7.0

At 82 degrees C. the friction is a minimum, it then begins to increase; at 115 degrees C. it is still 1 lb. less than at 29 degrees C. Warm, though not hot, bearings, therefore, appear to be advantageous.

EFFECTS ON IGNITION.

There is also another interesting point that so far appears to have escaped the attention of the chemist and the engineer—the effect of lubrication on charge-firing. At certain temperatures and pressures, trouble is experienced by premature so-called automatic firing of the petrol mixture. It has been stated, and by authorities of standing, that petrol charges cannot be compressed to much over five atmospheres without risk of premature firing. What this represents in temperature is difficult to say with accuracy, since one factor—the working temperature of the cylinder wall—has not been determined. Owing, however, to the thinness of the metal and the steepness of the heat gradient, it is probable that no great difference exists between the mean temperature of the inner and the outer skin, and that the mean temperature of the whole consequently is not greatly in excess of that of the jacket water. Although no temperature measurements seem to have been taken, certain considerations would appear to fix this temperature at from 200 degrees to 250 degrees Fahr. Assuming, therefore, the incoming charge to attain this temperature, and then by further compression to 75 lbs. to receive an additional rise of 374 degrees Fahr., its final temperature will be from 574 degrees to 624 degrees Fahr., which would stand as the critical point of automatic ignition. The principle and fact of ignition by compression is so well established in the minds of engineers that, for example, Messrs. De Dion and Bouton have patented a self-igniter consisting of a small cylinder in communication with the main cylinder. A piston compresses a little of the petrol mixture, and the ignition striking back fires the charge. Now, the point raised by the author is this: Is the automatic ignition of a petrol mixture possible under any temperature attainable in a water-cooled motor? He doubts the possibility. With a view to testing it, he recently took a 3 3-4-inch by 4 1-2-inch tin case, with tightly fitting cover, and successively introduced two, four and six drops of petrol, then placing the case over a Bunsen burner. At each attempt the heat was increased until the solder melted. In no case did ignition take place. He then took a jointless stamped tin case, 3 1-2 inches by 1 inch, and tried unsuccessfully with four and six drops of petrol to obtain explosion at partial red heat. Repeating the tests, using instead of petrol a cylinder lubricating oil of 410-430 degrees Fahr. flash point, 440-460 degrees Fahr. fire test, 910-915 density, ignition was readily obtained.

OILS AND IGNITION.

Not satisfied with the sufficiency of these results, the author questioned Messrs. Carless, Capel and Leonnard as to the temperature at which petrol vapor and air would ignite. On August 29 they replied: "From our experience we should have thought it would be impossible for a mixture of petrol vapor and air to ignite except on the application of a light." He then addressed an inquiry to Mr. A. Phillips, of Reading, as to the temperature of premature ignition in air-cooled motors. The answer was: "From practical experience with air-cooled motors I find that explosion usually takes place when the walls of the explosion chamber are just below red heat."

There are, therefore, the following phenomena:

1st. Failure of petrol vapor and air to ignite at even partial red heat.

2d. Ignition of lubricating oil under similar conditions.

3d. Automatic ignition of petrol charges in water-cooled motors at comparatively low temperatures.

4th. Similar ignition in air-cooled motors at higher temperatures. The conclusion to which these phenomena point is, that the automatic ignition of petrol charges is due, not to compression or temperatures attainable under running conditions, but solely and directly to the ignition of the lubricant employed. It takes place at a fairly low temperature in water-cooled motors because the oil used has a comparatively low flash point; and it occurs in air-cooled motors at a higher temperature because the lubricant employed has a higher flash point.

Turning for a moment to the lubricating oils in common use with water-cooled motors, the following figures are typical:

Flashing Point.	Burning Point.
410° to 450° Fahrenheit.	460° to 550° Fahrenheit.

If the author's suggestion be correct it might be supposed that three results would be noticeable:

1st. Premature ignition would be more frequent when excessive lubrication is employed.

2d. It would be continually occurring with lubricants of which the flash point is below 600 degrees Fahr.

3d. It should leave evidence of its occurrence in the form of carbon deposit.

The first result is distinctly noticeable. The second and third results would not necessarily follow. As H. B. Case, managing director of the Vacuum Oil Co., recently observed to the author: "The assumption that decomposition begins at burning point may be accurate, but practice seems to show that decomposition does not go far enough up to a considerably higher point than the burning point to cause deposit of consequence. This seems reasonable in view of the fact that the flash and burning points are determined by an accumulation, during a considerable period of heating, of enough vapor to flash or ignite; and, in practice, the vapor escapes, as it is driven out of the oil. After one flash an oil will go to a higher temperature before another flash occurs; and, if at the burning point the flame is blown out after ignition, the oil will go to a higher temperature before it will ignite again. The period of time which will elapse before another flash or a re-ignition occurs varies with the character of the crude petroleum from which the oil was made, and the processes of refining. The wide variation in these two things makes it impossible to deduce accurately from what one oil does, under given conditions of service, what another oil, even though similar in tests, will do under the same conditions." From this it will be seen that to produce the results in question three conditions must be fulfilled: There must be sufficient time for decomposition; sufficient oil to generate enough vapor to flash; and sufficient continuous burning to cause any deposit of consequence. In practice these conditions are not so frequently present. Excluding the suction stroke, when the temperature is too low for the purpose, the duration of oil exposure to vaporization or decomposition in the presence of air is confined to the compression stroke. The time factor is, therefore, very short. Unless indeed oil vaporization is continuously proceeding between the hot surface of the piston and the cylinder wall. On the other hand, continuous burning is or should be confined to the working stroke; very little carbon, therefore, should be formed. On this point Mr. Veitch Wilson, chief of the lubricating oil department, Price's Patent Candle Co., on September 9, wrote to the author: "The question as to what we may attribute the tendency of gas-engine oil to carbonize is an exceedingly difficult one, and suggests a prior question, viz.: whether the carbon found in gas engines proceeds from the fuel (gas, oil or petrol) or from the lubricant. From data before me, supplied by the authorities already referred to, I think that I am correct in saying that, in the case of a gas engine, the relations of gas and of lubricating oil used, gas being reduced to actual

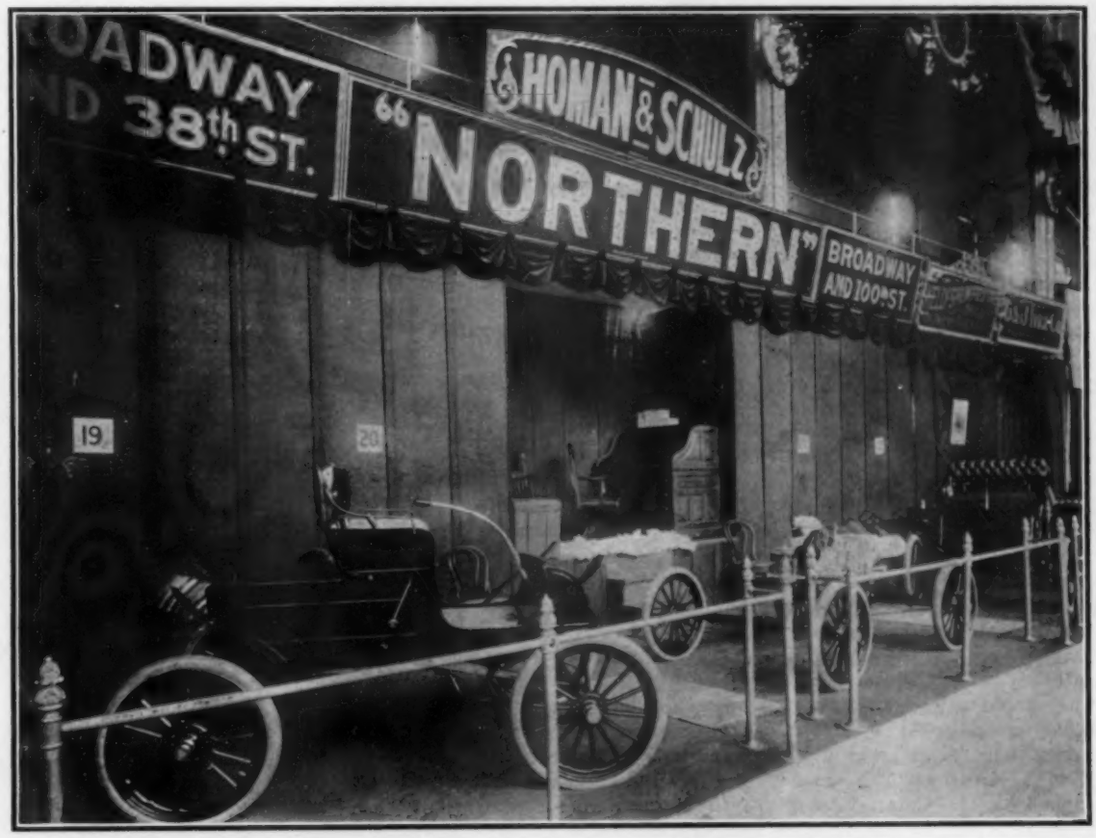


EXHIBIT OF NORTHERN AUTOMOBILES AT MADISON SQUARE GARDEN.

weight in accordance with its known specific gravity, are about 96 to 97 per cent. of gas against the balance of lubricating oil. Analysis shows that the composition of town gas, or of gases from mineral oil or from spirit, closely approximate one another, viz., hydrogen, say 84 per cent., carbon about 16 per cent., and on this assumption, it seems not unfair to suppose that the bulk of the carbonaceous deposits which are found in gas and oil engines is due to the fuel rather than to the lubricant." If this view is correct, lubricating oil, as it undoubtedly flashes during the explosion stroke, might also occasionally do so during the compression stroke, without betraying the fact by any material increase of carbon deposit.

The arguments that ascribe premature ignition to the flashing or burning of the lubricant, might be countered by ascribing it to incandescent carbon in the cylinder or ports. It is quite possible that this also may be a cause of pre-ignition. But it does not fully meet the case. As incandescence would be continuous, it should also lead to continuous pre-ignition; it should make pre-ignition independent of the amount of lubricant used, but the reverse is the case; it should confine premature explosion to cases where such deposit is present, but this is not in accordance with fact.

Speaking with the reserve due to imperfect study of the problem, the author inclines to think that low-flash lubricants are a cause of premature charge-firing. The easiest way out of the difficulty, therefore, would be to use only oils of the highest obtainable flash point. Unfortunately the oils of this description now on the market are extremely viscid. This gives rise to two fresh difficulties: one, the feeding of such oils into the cylinder; the other, the spreading or dispersion of the lubricant within the cylinder. The first difficulty could be overcome by a mechanically operated lubricator, such as Messrs. Snowdon use for their "Sinol," a graphitic lubricant of high viscosity. The second is thus described by Mr. Case: "An oil fed into steam is blown, by the velocity of the steam, into minute particles, which are carried through all the steam and deposited on all surfaces with which it comes in contact. In a petrol engine a drop of oil entering the cylinder remains almost intact, and oils of as high flash point (585° and 640° F.) and viscosity (234" @ 210° and 320" @ 210°) as 'Hecla' and 'Extra Hecla' will not spread over the surfaces." Both Messrs. Bluman and Stern and Messrs. Snowdon are inclined to differ from this view; the managing director of the former writing: "I am of opinion that by the combustion in the cylinder, the lubricating oil is spread in somewhat similar manner to the process going on in a steam cylinder"; that of the latter stating: "Any good oil, as 'Sinol,' is diffused or sprayed all over the cylinder." The fact, however, that inventions have been patented with a view to overcoming the difficulty mentioned by Mr. Case, rather points to its recognized existence, at least in the case of the more viscid oils.

As the author would, no doubt, be asked why in gas engines oils with 400° to 450° Fahr. flash point do not cause premature ignition of the charge, he may at once say that he has not studied the question. Very possibly, the cylinder temperature being kept lower and the quantity of the lubricant used being much more accurately determined, decomposition is sufficiently impeded. Again, it would appear as if hydro-carbon vapor exerted an influence on lubricants which a gas mixture does not. On August 28 Messrs. Crossley Brothers wrote to the author: "Some short time after we had commenced manufacturing oil engines, it was brought home to us that the class of oil suitable for lubricating a gas engine piston would not do so for an oil engine, as there appeared to be more tendency for the oil to carbonize and to cause the rings in the piston to stick."

The practical conclusions to which the author arrives are, first, petrol motors should be fitted with positive feed-lubricators, ensuring a sufficient, and no more than sufficient, oil supply; second, that with such lubricators high flash point oils should be used in preference to the oils now commonly employed. The high viscosity of such oils is favorable to the retention of compression; on the other hand, it tends to increase friction and thus also the temperature of the rubbing surfaces.

CONCLUSION.

The author has endeavored to bring the present technique of motor car manufacture briefly before the members of this institution because the industry is undoubtly one of growing importance, and because there are so many features that admit of improvement, and so many points that require the elucidation which the members of this instiution are pre-eminently qualified to give. The majority of manufacturers do not possess large financial resources, nor much available time for the technical research and experiment needed for the advancement of the industry. In some cases, alas, they do not seem to recognize the importance nor the real economy of dealing with the problems before them in a scientific manner. Time and money, spent on independent research, on obtaining expert advice on testing, analyzing, and so on, represents to them expenditure of capital better employed elsewhere; whereas, there cannot be a shadow of a doubt that, properly applied, time and money so spent are the most rigid and comprehensive economy that a manufacturing business can effect.

But it is not only to the members individually but to the Institution as such this subject is presented. From the former opinions and information are solicited; to the latter is submitted the question, whether considering the magnitude of the industry, the council of this Institution might not, in accordance with the practice and scope of our association, afford the same assistance as they have given to the gas engine industry. A Gas Engine Research Committee has been formed; could not the scope of this committee be extended to the investigation of the many problems surrounding and impeding the progress of the petrol engine?

The author begs to thank correspondents for information, and publishers for the loan of illustrations, courteously accorded.

THE COST OF ELECTRIC CHARGING FROM WIRE OR SPECIAL PLANT.

A Pittsburg firm, which deals in electric charging plants operated by gas or gasoline engines, gives an explanation of the expense involved in the charging of electric storage battery vehicles, accordingly as the current is taken from the wires of electric light companies and paid at meter rates, or generated by a gas or gasoline engine turning a dynamo.

The figures are of greatest interest to large consumers of charging current, such as owners of automobile garages, the economy gained by having a special plant being naturally much reduced in cases where only one or two automobiles are in use.

The principle, however, must be of interest to all who own or contemplate ownership of one or more electric vehicles. For the benefit of those not familiar with the system of electric current measurements, the data relating thereto are also given.

WHAT VARIOUS VEHICLES CONSUME.

The average runabout battery requires about 75 ampere hours per day to charge it. The average phaeton, surrey, victoria, brougham, or break battery requires about 100 ampere hours per day to charge it. The average delivery wagon battery requires about 175 ampere hours per day to charge it.

An ampere hour is 1 ampere of electricity flowing for one hour. For example, 100 ampere hours is 10 amperes of electricity flowing for 10 hours, as is 20 amperes for 5 hours, and as is 40 amperes for 2 1-2 hours.

The voltage at which this electricity is usually purchased is 115. Voltage is the same thing as pressure. The total quantity of power purchased is the ampere hours multiplied by the voltage. For example, 100 ampere hours put into a battery means 100 ampere hours x 115 volts = 11,500 watt hours of power taken from the street wires.

For charging one runabout the power which must be purchased per day, therefore, averages 75 ampere hours x 115 volts = 8,625 watt hours. For one phaeton, or similar size of vehicle, the power

per day would be 100 ampere hours x 115 volts = 11,500 watt hours. For one delivery wagon the power per day would be 175 ampere hours x 115 volts = 20,125 watt hours.

AN EXAMPLE OF COST.

If a garage has, for example, four runabouts, one phaeton, one surrey, one victoria, one brougham and two delivery wagons, or the equivalent of these, the total power purchased becomes:

	Watt hours.
Runabouts	8625 x 4 = 34500
Phaeton Size	11500 x 4 = 46000
Delivery Wagons	20125 x 2 = 40250
	120750

One thousand watt hours is called a kilo watt hour. 120,750 watt hours per day, therefore = 120.75 kilo watt hours. A kilo watt hour is usually charged for at the rate of 7 cents by most electric light companies. 120.75 K. W. hours at 7 cents = $8.45 per day.

ECONOMY OF GAS ENGINE PLANT.

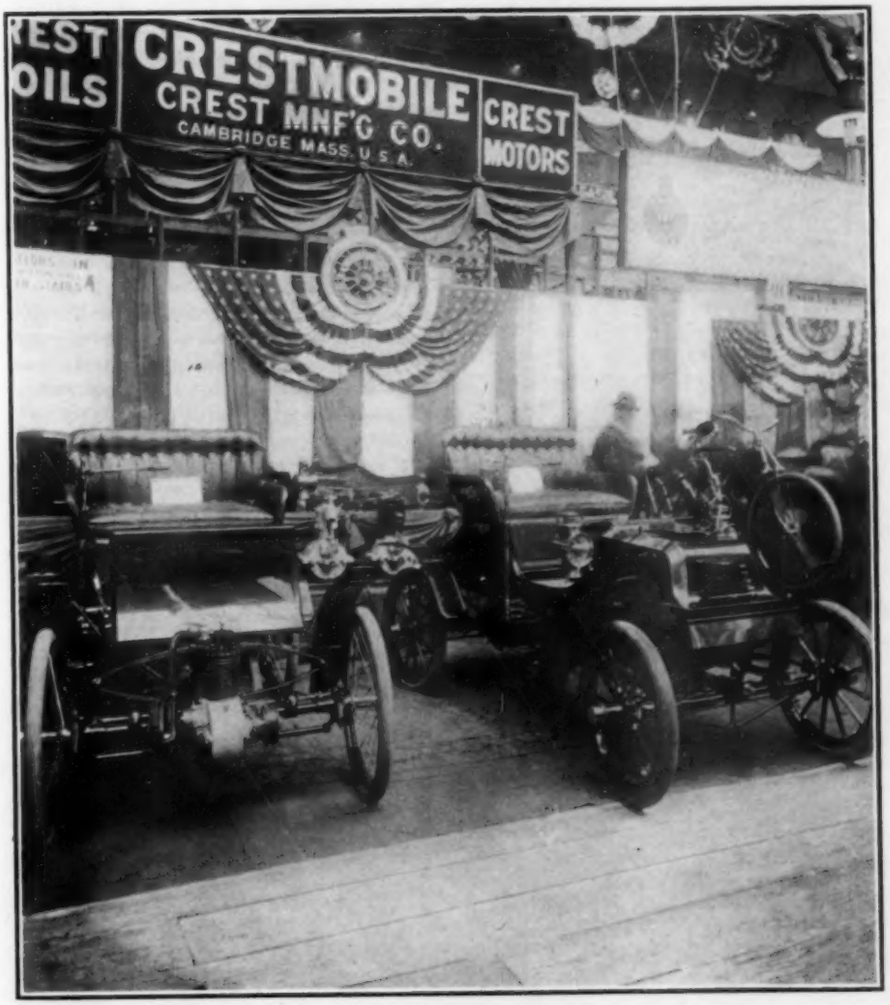
In a gas engine and generator, a kilo watt hour is usually guaranteed from 22 cubic feet of gas. Where gas costs $1.25 per 1,000 cubic feet, 22 cubic feet would cost 2.75 cents. Where natural gas is available and costs 30 cents per 1,000, 22 cubic feet would cost .66 cents.

APPERSON BROS. GASOLINE TOURING TONNEAU CAR AT THE GARDEN.

Therefore, with ordinary illuminating gas a kilo watt hour generated from a gas engine and dynamo costs 2 3-4 cents, and from natural gas, .66 of a cent.

At 2 3-4 cents per kilo watt hour, instead of 7 cents, the 120.75 watt hours necessary for charging the ten vehicles becomes $3 32 per day, or a saving of $5.13 per day.

At .66 cents per kilo watt hour, instead of 7 cents, the 120.75 kilo watt hours necessary for the ten vehicles becomes 80 cents per day, or a saving of $7.65 per day.



CRESTMOBILE LIGHT GASOLINE CARRIAGES AT MADISON SQUARE.

Motor Car to Pace Cresceus.

George H. Ketcham, owner of the champion trotter Cresceus, will test the motor vehicle as a pacing machine for the horse. Mr. Ketcham has already tried Cresceus against a motor bicycle, with very satisfactory results, and he proposes to continue the same line of experiment on a larger scale by using a four-wheeled motor car. The driver of the car can graduate its speed according to the effort expected of the horse.

The management of Madison Square Garden is already considering plans for the proper accommodation of the automobile show of 1904. It is proposed to remove all the seats in the front balcony, thus forming an aisle with spaces on each side for the lighter vehicles, leaving the main floor and restaurant as at present for the heavier cars. The parts and sundries would in this case be moved to some other part of the building.

Buffalo will have an automobile show when its turn comes, from March 9 to 14. The recent stop of the special show train from New York to Chicago has awakened the interest of the public as well as the motorists of Buffalo.

Foreign

GRADUAL DISAPPEARANCE OF BELT DRIVE SYSTEM.

SLIDING GEARS NOW SUPREME.

Electrical Transmission Used to a Very Limited Extent by French Makers—Improvements in Construction of Gears Has Caused the Abandment of Belt Drive.

Staff Correspondence.

PARIS, Jan. 16—Dealing in our last letter with the lessons of the Paris Show we pointed out at some length the tendencies of transmission gears, more particularly in the direction of simplifying the usual type of sliding gears, and, if possible, of replacing them with something more economical. So far the only alternative is the electrical transmission, but until makers are able to show much better results than they have done in the past, and can overcome the objections raised against it on the ground that the combination of dynamos, wires and electrical motors with a gasoline engine is likely to cause trouble to the automobilist, it is to be feared that the new system has little chance of securing the favor of the public here. For the moment the sliding gear stands alone, and has survived the many others which have from time to time made a bid for popularity, but whether this is necessarily the survival of the fittest for all classes of vehicles may perhaps be open to question.

INFLUENCE OF FASHION.

The automobile industry is influenced so much by fashion and popular whims that it is by no means certain whether a new device comes to the front on its merits or is merely the result of imitation, though as the best is only imitated as a rule it is probable that the success of the gear is not an exception. The original type of Panhard gear, improved and modified in several respects, has been adopted all round because it proved the most suitable in big cars. Its only competitor, the belt, for some years carried on a valiant struggle, and two or three of the leading firms made it a point of honor to champion this system, apparently with a certain amount of success.

In the early days of the industry the hope of the belt lay in the defects of the mechanical gear which appeared to be almost insurmountable. Apart from its indifferent construction through lack of experience and facilities of manufacture, which resulted in a rapid wear and tear of the toothed wheels, the gear was a very wasteful form of transmission and was very noisy in its action, especially when changing speeds. In face of these drawbacks the advocates of the belt were able to plead its superior advantages in the way of running smoothly and silently, and the only trouble was the liability to slip, which, moreover, was overcome by the use of jockey pulleys and other similar devices. It must be confessed, however, that in practice the belt was particularly troublesome on account mainly of the stretching of the leather and the frequent stoppages and loss of time necessary to shorten it, and in wet weather it was found impossible to protect it sufficiently from the dampness to prevent slipping. In those days most inventors of cars were attracted by the supposed advantages of the belt, but when they saw that these advantages were more than counterbalanced by defects they almost invariably came back to the mechanical gear.

IMPROVEMENTS IN GEARS.

Moreover, the advantages of the belt as regards silence and smoothness of running were lost in the improvements that continued to be carried out in the sliding gears. Not only were the teeth cut in a way to allow of their being put into mesh more easily, with much less wear and tear, but the motor itself acquired more elasticity which thus gave to the mechanical gear a decided advantage over the belt for reasons that we shall deal with presently.

The efficiency of the belt lies solely in its adherence on the pulleys. It should slip sufficiently under violent strains, such, for example, as are experienced when changing speeds or meeting with sudden resistances on the road, so that these strains should be taken off the mechanism, but at the same time the adherence should be sufficient to prevent the slightest tendency to slip under normal conditions of running. At first an attempt was made to attain this end by the employment of jockey pulleys. This proved satisfactory to a certain extent, but they gave a heavy and cumbrous look to the frame of the vehicle and compared very unfavorably with the neat appearance of the gears. Makers saw that the public looked askance at the jockey pulley, which obviously could never become a success. They then learned that the only other means of ensuring adherence was to run the belt at a fast and uniform speed. This necessitated an entire change in the design of the mechanism. The belt was employed in conjunction with gear wheels, and the usual method was to run the belt on fast and loose pulleys, the former running at a very high rate of speed. This gave an adhesion on the pulleys which effectually prevented any slipping. The short belt usually ran at a constant speed from the motor shaft to the crankshaft, on which was carried the change speed gear, power being transmitted to the rear wheels by chains. The belt thus entirely lost its original purpose and merely served as a sort of buffer between the engine and the spur wheel gear, from both of which it was supposed to take off strains due to shocks.

BELT ENCLOSED IN CASE.

This system has undoubtedly certain advantages, for the old objections to the belt are entirely overcome. Being short and occupying little space, it can be enclosed in a case, and running as it does at a high and constant speed, it slips only under violent strains. On industrial vehicles the system is still being used and is likely to enjoy a good deal of favor, but for pleasure vehicles its utility has been entirely destroyed by the improvements carried out in the motors. If the efficiency of the belt depends upon a high speed it is evident that its advantages are lost with the newest types of motors which are slowed down to as much as 200 revolutions, and under normal conditions rarely run at more than 800 or 900 revolutions, that is to say, at half the speed necessary to give the greatest efficiency to the belt. The slow running motor has thus given the *coup de grace* to the belt as a transmission.

Its first serious defeat was the abandonment of the system by De Dietrich about a year ago when this firm, who had always stood by the belt, gave it up in favor of the Turcat-Méry system of car. Their example has now been followed by Delahaye, who were almost the sole remaining survivors. Both, moreover, celebrated the rejection of the belt by replacing their horizontal engines with vertical motors, at least in the pleasure carriages, for it is significant that both are still employing their old engines and belt transmissions for the industrial vehicles. As the pleasure and industrial cars are developing on entirely different lines and have to fulfil different conditions, the one mainly in the direction of speed and comfort and the other of reliability and economy, it is quite possible that the horizontal motor and belt will prove satisfactory in the heavy vehicles. The industrial cars are certainly economical and successful, and Delahaye, for example, have just sent four or five breaks, with postal compartments attached, to Guadeloupe, where they are to be employed in a public service.

BELTS ABANDONED FOR TOURING CARS.

The belt has now been finally vanquished in the touring car, and its glory has departed along with the failures of a good many other devices which have been tried and found wanting in the past. For a long while it still clung to the voiturette, where certain small makers adhered to the system of running it at high speed from the motor shaft to the change speed gear on the rear axle, but at the Paris Show nearly all these firms had abandoned it, and very few examples of belt transmissions were to be seen even on the lightest cars. It is clear that the belt can never prove successful on pleasure car-

riages in conjunction with change speed gears, for the public naturally argue that if a vehicle can be driven with the change speed gear alone they can very well do without the belt, which is no longer indispensable and has merely become an adjunct to the gear, the more so as its efficiency is diminished by the slow running engines which are coming into fashion.

Still, if the belt seems to have been finally discarded in this country a good deal of attention is being paid to it by inventors elsewhere who are taking out many patents for improved pulleys, usually of the expanding type, and the expanding pulley is, in fact, the last hope to which the belt clings, though whether this hope is a forlorn one the future alone can tell.

FRENCH SPEED LAWS OBSERVED CHIEFLY IN THE BREACH.

Staff Correspondence.

PARIS, Jan. 23—This city has been defined as a paradise for women, a purgatory for men and—the other place for horses, and if it were necessary to say in what category stand the automobiles we should be tempted to put them in the sultry atmosphere of the last named classification. On the whole the automobilist has no cause to complain of any undue interference with his liberty in a land where the law is usually tempered to the necessities of the moment. The laws concerning automobile traffic are very severe, and if taken to the letter the lot of the man who drives a motor vehicle would be anything but a happy one.

Fortunately, however, those who make the laws are perfectly alive to the advisability of not doing anything which may hamper the progress of a great national industry. This has become an article of faith among the governing classes, with the result that having tied down the automobilist with all sorts of restrictions and limitations, and made it almost impossible for him to go out without running the risk of attention from the police, the government and the local bodies have tacitly agreed to leave automobilists alone so long as they are not a source of danger to the public. The speed limit on the highways has practically become a dead letter.

In Paris, however, the situation is still a very serious one for the automobilist. In busy parts of the city the speed limit is fixed at seven miles an hour and on the outskirts motor vehicles are not allowed to be driven at more than twelve miles, while if they happen to wander off into the Bois de Boulogne they may find themselves in trouble if they go at more than walking pace. The speed regulations vary so much in different districts that the unfortunate chauffeur is puzzled to know when he is breaking the law or not. In the Bois he can only be on the safe side by getting down and leading his car along with a string.

In that miserable period of automobile industry when war was carried on to the knife against the drivers of motor vehicles the government hoped to insure their identification by compelling them to fix numbers to their cars. This had one good result in allaying public feeling and putting an end to the discharge of brick bats with which automobilists were received in certain parts of the country alleged to be civilized, and so long as they were left alone they felt that peace had been purchased very cheaply at the expense of the numbers.

Now that the police in Paris are showing an unnecessary zeal in hauling up chauffeurs for fancied offenses, and are using the number for the purpose of identification, the unfortunate owner finds that he has fallen from the frying pan into the fire. If the number were really effective as a means of identification there would be little ground for grievance, but it is so difficult to read the numbers on cars traveling at even well within the legal limit that the police are frequently making mistakes, with the result that a considerable number of automobilists are put to great trouble and expense in proving that they were somewhere else at the time of the alleged offense, even if they succeed in doing so at all. Conviction invariably means a fine and a minimum of two days' imprisonment.

The way in which automobilists have been thrown into prison in the company of common malefactors has become such a crying scandal that all classes are now urging for a reform. Huge petitions are being signed praying for the suppression of the numbers and a reorganization of the traffic regulations, on the ground that if the Paris police are allowed to continue their campaign it will mean the ruin of the industry. Things have come to such a pass that a reform is imminent. The Municipal Council of Paris are drawing up a new series of rules in which it is hoped that the speed limit will be done away with altogether, and at the closing of the Paris show the President of the Republic poured balm upon the wounded feelings of chauffeurs by releasing all those who were in prison for alleged furious driving. This is a sign of the times, and the new year opens with a promise of liberty in a city which has so far belied its old and most cherished traditions.

A good deal toward bringing about this more liberal treatment of automobilists has been done by the various congresses which have been held from time to time, and in this and other ways the congresses have shown that they are capable of doing valuable work for the defense of owners and the development of the industry. They are of considerable importance, too, as an educational medium, as was proved by the success of the congress held in the Grand Palais during the show when the different meetings were largely attended by the public. In 1901 the international congress took place at Dijon, and another is to be held in Paris this year, probably in June, while Lyons has been selected for the meeting in 1904. The developments of the industry are so rapid that these annual congresses have become a necessity, for the interchange of ideas among automobile engineers and users from all countries does more than anything else to keep the industry in the path of progress.

International Exposition at Athens.

Special Correspondence.

WASHINGTON, D. C., Jan. 30.—Word has reached this city to the effect that the International Exposition of Industry and Commerce, which was to have been opened in Athens, Greece, in October last, has been postponed until April 7, 1903. The postponement was found necessary in order to allow the Greek Government more time for the organization of the movement. Incidentally, it will allow more time for foreign nations to participate. With the additional time given, a representative display of American productions is made possible. It would be difficult to say along what lines special effort should be made, since the Greek market is open to almost everything in the way of manufactures. The general classification of the exposition will include fourteen departments or groups. In group 7 will be shown exhibits of electromotors, automobiles, bicycles and other forms of locomotion.

Edge Warns Rash Imitators.

No less important information is vouchsafed correct by Mr. S. F. Edge, of the Napier Company, of England, than that the Cannstatt builders of Mercedes cars have abandoned the three most broadly imitated improvements characterizing their product of 1902. In a communication to the trade Mr. Edge claims to know that neither the honeycomb radiator or the pressed steel frame or the mechanically-actuated inlet valves will be features in new Mercedes models, having been superseded by better methods.

An interesting combination of two of the most modern inventions was exhibited at the Paris show, an automobile wagon fitted up as a wireless telegraph station. The body forms a room for two operators, with sending and receiving apparatus, and on the side of the wagon is carried a pointed pole of bamboo which can be extended to a height of about 60 feet.

The latest French automobile fire engine, exhibited at the Paris show, has a speed of 17 miles, and can throw 1,500 gallons of water per minute to a distance of 140 feet horizontally or 100 feet vertically.

The latest thing in trackless racing is to offer to challenge Fournier or Winton next fall.

Auto Carnival on the Sands at Florida East Coast Resorts.

Winter residents in Florida have lately developed a considerable interest in automobiling as an addition to the pleasures of their seaside sojourn. Fishing, sailing and golfing now have to give place to an exhilarating ride on the smooth hard sands of the east coast beaches as a means of healthful recreation and outdoor enjoyment.

FLORIDA RACES SUGGESTED.

W. J. Stewart, the newly-appointed chairman of the race committee of the Automobile Association of America, has become interested in the contest possibilities of the Florida sands and will make a personal inspection of conditions in the vicinity of Ormond in the gasoline touring car La France, which was a feature of the New York Show. It is the intention to set a date early in March for a carnival which will last three days, opening with a floral parade and including a subsequent lengthy programme of racing.

WEATHER AND ROAD CONDITIONS.

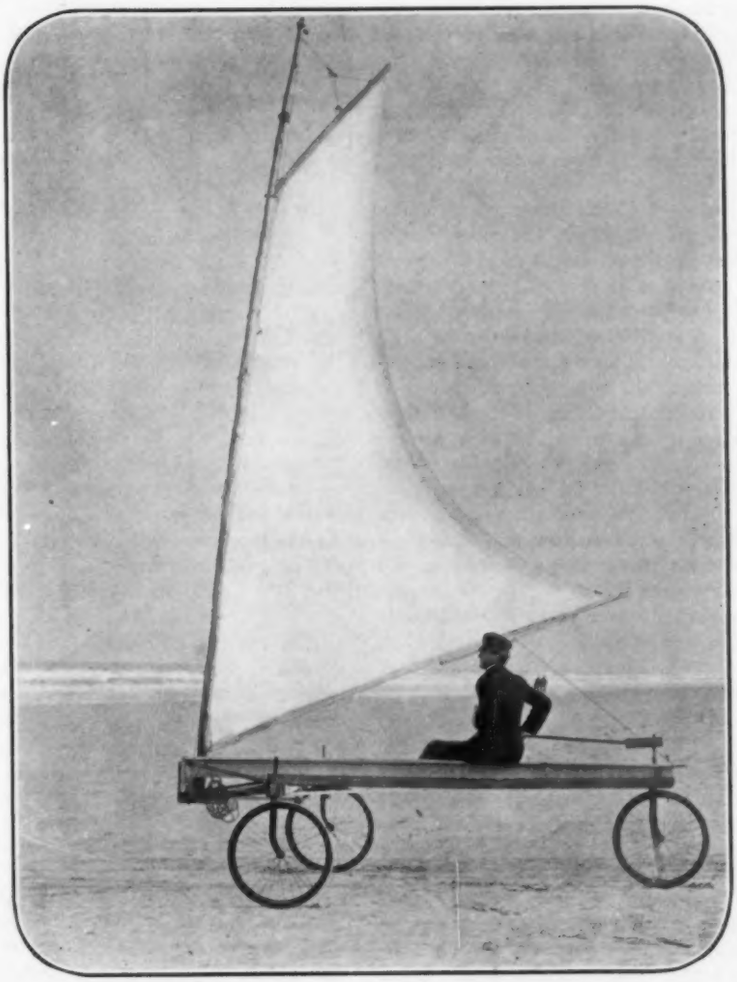
J. F. Hathaway, of Somerville, Mass., who has taken his steam runabout to Daytona, a town on the coast not far distant from Ormond, writes enthusiastically about the weather and road conditions. A record of the former shows that from December 12 last to January 16, there were but three stormy days, and usually the noon temperature ranged from 50 to 80 degrees.

Daytona has a population of over four thousand, composed largely of winter residents from all over the country. Its streets and avenues are laid out 100 feet wide, well graded, with many miles of smooth marled and shell roads. The town lies parallel with the Halifax river on its west bank, and extends for two miles along the shore. It is situated in a forest of large liveoaks covered with clinging moss that overhangs the streets and walks. Among them are many orange trees, palms and palmettos, sweet bay trees, magnolias, holly trees, trumpet vines and wild grapes. The roses are always in bloom and the vegetable gardens look like midsummer in the North. It is a paradise for the wheelman. The roads are very level and smooth and the wheel is very popular there, both for business and pleasure.

J. P. HATHAWAY IN STANLEY RUNABOUT.

Daytona Beach is reached by three bridges that cross the Halifax river within a distance of two miles. The river is about half a mile wide and the beach is one mile from the town over smooth streets and avenues. A bridge has also been placed over the soft sand on the edge of the beach so that an auto or a wheel can get onto the hard sand without any difficulty. "The beach is perfect and is a continuation of the famous Ormond beach, well known in connection with the Hotel Ormond which is located on the Halifax, six miles north of Daytona," writes Mr. Hathaway. "It extends along the coast for more than thirty miles in a straight line and is from four to six hundred feet wide at low water. The average rise of the tide is about two feet. There is always a good beach for riding several hours every day. The sand is nearly as hard as asphalt and very smooth. There are no stones whatever. No

TYPICAL STREET SCENE IN FLORIDA EAST COAST WINTER RESORT.



ORIGINAL HOT AIR AUTOMOBILE DESIGNED IN FLORIDA.

road or street was ever built that is so smooth to ride over as this beach. It is so wide and smooth that it does not require much nerve to run a machine to the limit. Imagine a boulevard 500 feet wide, dead level for thirty miles, smooth as a floor. There is an auto here that weighs 5,000 pounds, and it makes no impression on the hard sand of the beach. It is an ideal race course and the place where world's records will be made in the future. Is there another spot where one can sit still on a bicycle and coast for thirty miles at great speed by the force of the wind without touching the pedals? This condition does not exist every day, but only when we have a strong north or south wind."

SPEED TRIAL ON THE BEACH.

There are now about a dozen automobiles at Daytona, and many more are expected, especially when the favorable riding conditions become more generally known. The steam runabout of Mr. Hathaway's, which ran the mile in 1 min. 30 sec. at Narragansett Park, Providence, was tried out on the Florida beach and covered the distance in 1 min. 14 2-5 sec., with the same conditions in both trials. In the latter case, however, there was a 50 mile an hour wind, blowing in the direction the machine traveled.

A novelty at Daytona is the auto propelled by sails, shown in the accompanying photographs, which calls to mind the familiar ice boat of the North. This is owned by E. D. Mills, who has sailed ice boats, and it has provided a lot of sport for the along-shore navigators.

A five mile course has been laid off under the direction of Mr. Hathaway with mile and half mile distance posts. There is a good auto station at Daytona and machines can be shipped by steamer from New York at moderate cost.

A new cushioning device, the invention of C. L. Horack, was tested in New York streets on February 2 by Henri Fournier, being fitted to a 40 horse-power Mercedes car. The device consists of air and oil reservoirs between the body and the frame, assisted by metal springs. After trying it on rough cobblestone pavement Fournier praised it as the best he had yet tried.

GROUP OF AUTOMOBILISTS ON THE SANDS OF THE ATLANTIC OCEAN AT DAYTONA, FLORIDA.

THE AUTOMOBILE

VOL. VIII. NO. 6

Published Every Saturday
by
THE CLASS JOURNAL CO.

395 BROADWAY NEW YORK CITY
Cable Address - - - - Autoland, New York
Long Distance Telephone - 3405 Franklin, N. Y. City

Western Office: - - 356 Dearborn Street, Chicago, Ill.

SUBSCRIPTION RATES:

United States, Canada and Mexico, One Year, $2.00
Other Countries in Postal Union, - One Year, $3.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS:

ENGLAND:—Iliffe & Sons, Limited, 3 St. Bride Street, Ludgate Circus, London E. C.
FRANCE:—Boyveau & Chevillet, 22 Rue de la Banque, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

To Advertisers—Copy or changes in orders for advertisements for the issue of the week following should reach us not later than Saturday.

Copyright, 1903, by The Class Journal Company.

Entered January 2, 1903, at New York, N. Y., as second-class matter.

The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly).

SATURDAY, FEBRUARY 7, 1903.

MATERIALS OF CONSTRUCTION.

Difficulties in securing proper materials of construction which have proved such a serious cause of delay, expense and annoyance to our builders are experienced also by foreign builders to a far greater extent than is commonly supposed. It is true that in many cases the foundryman or steel maker abroad is willing to put forth special efforts in the production of small lots that in this country would not be attractive orders for such concerns. Nevertheless the difficulties in the way of getting materials up to standard in European works are a serious cause of loss. In the best factories, where the closest scrutiny of materials is observed at every stage of manufacture, the percentage of wasters in cast iron cylinders is very large, defects often not developing until a considerable amount of machining has been done. Builders frequently are compelled to go the rounds of all available foundries before some painstaking and skilful shop is hit upon. In some cases makers are obliged to go outside of their own country for castings. In the case of steel castings the conditions are worse. In fact, so defective have these proved that in some notable instances builders have discarded them altogether and where strains do not call for the employment of forgings malleable castings are employed. There has been a marked advance in the quality of aluminum castings turned out and in one case that came to our notice the builder has installed his own foundry, and uses the output very freely in construction, the product being an exceptionally fine and tough metal. In the case of rolled steel, foreign mills have been more responsive to the demands of the automobile trade than those on this side. This, of course, might be expected, for America leads in the production of immense quantities of steel material of standard shapes, charges for deviation being out of proportion to the prices for regular commercial shapes. With the marvelous growth of the automobile industry these conditions are, of course, changing, and the time is not so far distant when the wants of the motor car builder will be as much a matter of ordinary commercial demand as those of the locomotive or marine constructor are to-day. There is now a splendid opportunity for the scientific foundryman to establish a reputation in the automobile field that will in time prove an enormously profitable asset.

PROGRESS FROM WITHIN.

The show accentuated the sharp distinction between two classes of gasoline motor vehicle builders. One asks: "What must we do to be in the swim?" The other: "What construction will answer the purposes of mechanical locomotion." If automobilism were just the same in one country as in another, the two classes would blend into one another more than they do. But we receive our notions as to what constitutes automobile fashion from the world at large, and especially from France where the automobile movement as yet is mainly a luxury movement tending to separate the strata of the population even more than they were separated before.

The French automobile "in the swim" is the one which most completely serves this purpose. This includes mechanical efficiency in a very high degree, but in a peculiarly high-strung manner that does not register with some of the principal requirements that must be made of mechanical locomotion in this country. The French industry, as represented in the celebrated models which we admire and imitate, works from an uncompromising conception of mechanical and sportsman's ideals—to be realized at any cost—toward other incidental advantages. But the latter do not cease to be incidental. It arrives at certain admirable results produced by a certain organization of details, which organization is a matter of growth as much as of choice.

Those who adopt this organization in its totality and its changing details with it, belong to the first class above referred to, and if they are truly faithful to their prototypes in workmanship, weights, material and combination of details, their product will of course be excellent instruments for satisfying the demands of one class of autoists.

On the other hand, there have, from the beginning of the automobile movement in this country, been constructors who viewed their work in a different light and worked by different methods. They conceived of mechanical locomotion in its relation to the people who were to use it, the topography of the country where it was to be used and the total of social and financial conditions in which it was to be embraced. They worked from the minimum of cost and the maximum of simplicity compatible with the fundamental idea of power vehicles toward such additional degrees of complexity, efficiency, comfort and luxury as might be forced upon them by their customers and by the growth in their own ideas of the requirements.

The two classes of builders have worked out the solution of construction problems from two opposite ends, and they have not yet met in the middle. What separates them, and probably will separate them still farther, is the differences in the purposes for which they work. One works from a worthy but strange example set before him at yearly intervals. The other from his inner consciousness enriched by personal experience, capable of checking his errors and modifying his conceptions from day to day.

Fortunate those who combine the two systems, who emulate while they imitate and criticise while they adopt! To them belongs the future, because they will reach mechanical completeness, which forms part of the European traditions, and also the complete responsiveness to local or American special conditions at the earliest possible moment. And the industrial race is to the swift.

In the recent show the line of demarcation between the two methods is still sharp, though with no lack of manufacturers who bridge the gulf by placing constructions of both kinds in the market.

It need hardly be said that low cost of production is not the only aim of those who keep aloof from foreign imitation. They conform to native tastes, native roads and considerations of utility, as much as to the necessity of producing types which can be made for the many by high-priced labor.

AN OPPORTUNITY FOR DESIGNERS.

If we have a given machine, capable of doing certain work, and we wish to build another which shall be cheaper and shall do the same work, we may do one of three things. We may arbitrarily use cheaper materials, adding weight to preserve strength; we may cut down the extent or accuracy of the machine work, or we may simplify the machine, perhaps redesigning it altogether, with a view to obtaining the same results as before with a simpler mechanism. If the machine is an automobile, some of its efficiency is lost in the first procedure, and (usually) some of its life or efficiency, or both, in the second.

To the conscientious designer neither of these methods is admissible until the way has been paved for it by such a use of the third—redesigning—as will make possible a reduction in the cost of material or labor without sacrifice of efficiency. Practically such a thing is impossible if the cheapening is in material, and the only legitimate question is at what point the high cost of the best material offsets its benefits—in other words, what degree of efficiency is worth paying for. The need for high-class workmanship on the other hand will depend in great measure on the character of the design, and it is here and in the line of simplification that real progress is to be looked for.

For all-around efficiency and small loss of power between engine and wheels, probably there is no system of transmission equal to the motor-front with jointed shaft, direct drive on the high speed and sliding gears running in oil. Unfortunately it is by far the most expensive. The "motor-back" arrangement, with direct chain drive on the high gear, is very efficient in a way, but it does not readily lend itself to multiplied gear changes. Two forward speeds are about the limit in the available body space, if the high speed is direct, or three speeds if the direct drive is sacrificed. Sliding gears are expensive, and as this arrangement is materially cheaper than the "motor-front" it results that individual clutches or planetary gears are commonly used with it, and efficiency is subordinated to low prime cost. Somewhere between these two extremes, in point of efficiency and first cost, comes the motor-front type, with counter-shaft and two-chain drive.

There is great need, particularly in the domain of light vehicles, for a design which shall combine the efficiency of the shaft drive and the low cost of the common runabout type. The latter is too wasteful of power to permit us to look upon it as a permanent solution of the problem, and the former can never be "the automobile of the masses." Evidently there is a chance here for a radical departure, and we may be sure that sooner or later it will come.

Tests of the automobile for carrying rural mail delivery services have been carried out in Lenawee County, Michigan, with very satisfactory results. The tests extended over a period of a month, and the routes provided averaged in length from 10 miles to 29 miles. The weather conditions were very unfavorable, snow being several inches deep on the ground, and ice was met with at many points along the road. It was shown that on the longest route, the time occupied in delivering and collecting the mail was about one-half that formerly used by the horse-drawn vehicle.

The first meeting of an automobile club in Pittsburgh was held on January 27.

Automobile Club Run to Lakewood.

The Runs and Tours Committee of the Automobile Club of America has arranged a special outing at Lakewood for Washington's Birthday, which is expected to bring out a large number of cars. An informal run will be made from New York and other points to Lakewood on Saturday, February 21, with a rendezvous at the Lakewood Hotel for dinner at 6:30 o'clock, the dinner taking place regardless of the weather. Sunday will be spent about Lakewood and at 9 A. M. on Monday the party will start on a paced run to New York.

ITINERARY OF THE ROUTE.

NEW YORK TO LAKEWOOD.

FIRST SECTION.

New York to New Brunswick.

(Newark to New Brunswick: All Macadam.)

MILES Total.	MILES Intermediate.	
		753 Fifth Avenue, N. Y. City (Club House). West 23d Street, Desbrosses, or Cortlandt Street ferries to
0	0	Jersey City. Straight ahead one block to sign "To the Boulevard," turn left one block; turn right into York Street (sign) which follow to Henderson (sign); turn right into Henderson and continue to Mercer Street (sign); turn left into Mercer Street and straight ahead through Glenwood Avenue to the Hudson County Boulevard. Turn right into Boulevard, which follow to first street with trolley tracks (Harrison Turnpike); turn left into Turnpike (rough) and ride to Broad Street.
8	8	Newark. Turn left on Broad Street and go to Clinton Aveuue; turn right on Clinton Avenue and follow asphalt to Astor Street; turn left on Astor Street for two blocks, then diagonally left on Frelinghuysen Avenue (Newark Avenue) and follow Penn. R. R. direct into Broad Street.
13.5	5.5	Elizabeth. Do not cross railroad but turn right into Westfield Avenue to Cherry Street, thence Cherry Street into Rahway Avenue (St, George's Avenue) to outskirts of
18.5	5	Rahway. Continue to and past Colonia Station to
21.5	3	Iselin. Cross to south side of railroad and follow railroad tracks to
		Menlo Park. Cross tracks to north side and follow straight to
25	3.5	Metuchen. Straight ahead to bridge and over Raritan River into Albany Street.
30	5	New Brunswick (Mansion House.)

SECOND SECTION.

New Brunswick to Lakewood.

(All Macadam.)

30	0	New Brunswick (Mansion House.) First turn on left (Burnett Street), up steep hill straight to
38	8	Old Bridge. At Hotel, turn right to
40.5	2.5	Spotswood. Turn left to
44.5	4	Jamesburg. Turn left, follow road across tracks to Lower Jamesburg, turn right to
50.5	6	Englishtown. Straight to

(*Continued on following page.*)

(Automobile Club Run to Lakewood—Continued.)

MILES Total.	MILES Intermediate.	
55.5	5	Freehold. Turn right at South Street to
58	2.5	Turkey. Straight to
64	6	Farmingdale. Follow Main Street to
67	3	Lower Squankum. Cross bridge at
		Squankum. Take middle fork to
72.5	5.5	Lakewood. (Laurel-in-the-Pines, Lakewood Hotel.) Garage opposite Laurel House, Main Street.

ALTERNATE ROUTE.

NEW YORK TO METUCHEN.

(Via Staten Island.)

753		Fifth Avenue, N. Y. City (Club House).
0	0	42nd Street ferry to Weehawken, climb hill, turn left at top to Clifton Terrace, cross to Hudson County Boulevard, turn left to
11	11	Bergen Point. Turn left one block to ferry (every 20 minutes) to
11	0	Port Richmond. Up street (Richmond Avenue) with single track, to hotel (Morning Star Rd.) (2 miles) turn left, straight to bridge (4 miles) turn 90° right (Richmond Rd.) to ferry (5 miles).
24	13	Tottenville. Boats on the average about every hour, difficult at low tide for large cars.
24	0	Perth Amboy. Straight to fork, three blocks, take right fork to
30	6	Metuchen.

AUTOMOBILE SKYSCRAPER PROJECTED BY TRANSIT COMPANY.

Rumors were current in New York this week to the effect that W. J. Arkell, one of the owners of *Judge* and *Frank Leslie's Weekly*, intended to erect a modern building upon the site of the Dorlan Riding Academy on 59th Street, to be largely devoted to automobilism. An extensive and model repair establishment in the basement, a garage of unusual dimensions occupying the ground floor, show and salesrooms on the second floor, constituting a permanent exhibition and mart of the whole automobile industry, and sumptuous quarters for the Automobile Club of America, or any other automobile organization, on the third floor—these were the interesting features of the plan. Seventeen stories above there was to be a roof garden, to be conducted on a high plane commensurate with the tastes and social status of automobile owners.

"Some such plan has been in contemplation," said Mr. Arkell, when seen at his office at 74 Broadway, which is also the office of the American Venture Company, "but the project seems to have fallen through, mainly because the Manhattan Transit Company did not succeed in buying the site and building."

Questioned in regard to the possibility of the plan being followed up in another location, Mr. Arkell stated that it might be realized in one form or another, but at present nothing definite could be said.

PLANS FOR THE GORDON BENNETT INTERNATIONAL CUP RACE.

The time for entering as a candidate for the honor of representing the Automobile Club of America in the Gordon Bennett cup race ended at midnight on Saturday, January 31, the last week bringing no new entries. As the list now stands Alexander Winton, of Cleveland, is selected as one representative, while there are four candidates for the two remaining places who have posted their forfeits and will be in New York on April 11 in readiness for such tests as the club may elect.

These four are: Percy Owen, New York; L. P. Mooers, Cleveland; Henry S. Harkness, New York; C. W. Matheson, Grand Rapids, Mich.

Mr. Winton will, of course, drive a new Winton car with horizontal engines, and Mr. Owen will also drive a Winton. Mr. Harkness, who has driven a Mercedes-Simplex car during the past season in races at New York and in the West, is not only a skilled amateur driver, but an enthusiast in design and construction. He has not yet announced what car he will drive, but it is understood that a machine of new design which is under construction near New York will be used by him. He will start in the Paris-Madrid race, whether or no he may be selected for the Gordon Bennett cup race.

Mr. Matheson is building two cars, one of which he will use in the April trials.

The Race Committee of the Automobile Club of America held a meeting on February 3 to consider a letter and a cablegram from the Automobile Club of Great Britain and Ireland in regard to the date and course for the Gordon-Bennett cup race. The cablegram asked whether July 9 would be satisfactory to the A. C. A.; the letter from David Solomons, chairman of the Foreign Relations Committee of the A. G. B. & I., under date of January 20, announced the discovery of a suitable course in Ireland, which would be used if possible, in which event the club would fix a later date than the Paris-Madrid race, May 24.

The proposed course is an irregular triangle of 126 miles length in the southeast corner of Ireland, from Naas, through Kildare, Stradbally, Ballyroan, Athy, Kilcullen, Carlow, Athy, Kilcullen to Naas again. The road is pronounced to be in very good condition and entirely suitable, and the sentiment in Ireland is thoroughly in favor of the race. Parliamentary consent will, of course, be necessary, but it is believed that this may be had.

The Race Committee cabled its approval of July 9, and at the same time wrote to Mr. Solomons to the effect that the A. C. A. favored a course in Great Britain, inasmuch as the cup had been won by a British subject.

New Members of the A. C. A.

At a meeting of the Board of Governors of the Automobile Club of America, on February 3, the following new members were elected: Active, William Rockefeller, James A. Burden, Jr.; Lawrence Waterbury, Henry Randolph Sutphen, James C. Ayer, J. McMillan Hamilton, James E. Woodbridge, John B. Trevor, Carleton W. Nason, William E. Harman, E. Virgil Neal and Frederick Glassop, of New York; John W. Thompson, Yokohama, Japan, and E. H. Bennett, Bayonne, N. J. Associate, W. E. Harkness, Cleveland; Clifford B. Harmon, Philadelphia; S. D. Waldron, Warren, Ohio; William H. McKelvy, Easton, Pa., and Alfred Weld, Providence, R. I.

MASSACHUSETTS HOTBED OF AUTOMOBILE LEGISLATION.

OPPOSING INTERESTS AT WORK.

Massachusetts Automobile Club Asks for Extension of Speed Limit to Maximum of 20 Miles an Hour—Higginson Bill Would Bar All Vehicles Capable of More Than 20 Mile Rate of Speed and Requires Licences.

Special Correspondence.

BOSTON, February 2, 1903.—There has never been such a wide demand for automobile legislation in Massachusetts as that evidenced by the petitions for new laws which made their appearance in the offices of the clerks of the Legislature at the State House in Boston just before the time-limit allowed for new business expired last Saturday. From two distinct factions of automobile users came bills intended to be favorable to the automobile, and aiming more than anything else to extend the speed limit beyond its present allowance of fifteen miles in the country and ten miles in the city. With other minor petitions for bills affecting motor cars either directly or indirectly, there was one offered by violent opposers of the automobile on a petition presented by Major Henry L. Higginson, the well-known Boston banker, who has a summer place in the fashionable district of Manchester-by-the-Sea, and was active there a few weeks ago in preventing the selectmen from authorizing a line of trolley cars. This Higginson bill has aroused the motorists to renewed interest in their expected legislative contest, and when the bills are taken up by the proper committee, there will be some lively discussion and numerous speakers.

The Higginson bill would require motorists to take out licenses for themselves and machines from the State Highway Commission, and would prohibit the use in Massachusetts of any motor vehicle capable of making more than twenty miles per hour. Here is the measure in full:

THE HIGGINSON BILL.

AN ACT

Relative to licensing Automobiles and Those operating the Same, and to regulate Speed of Such Vehicles.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Section 1. No automobile shall be run upon a public highway unless a license therefor shall have been first obtained from the Massachusetts highway commission, and no person shall operate or be permitted to operate by the owner thereof an automobile upon any public highway unless he or she shall have a license from the said highway commission.

Section 2. The Massachusetts Highway Commission is hereby authorized to issue licenses to owners of automobiles authorizing the automobile described in the said license to be operated so long as said license shall be in force upon any public highway, and each license shall be numbered and a record thereof kept for public inspection, and the number thereof placed upon the side or back of the said automobile in Roman characters not less than four inches in height. The said license shall contain a brief description of the automobile, giving weight, color, maximum speed capacity and shall designate the color of lettering to be used: provided, that no license shall be issued for any automobile having a maximum speed capacity of over twenty miles an hour or at that rate for any part of an hour.

Section 3. The said commission is hereby authorized in their discretion to issue licenses to any person to operate an automobile upon any public highway so long as his or her license shall be in force.

Section 4. No automobile shall be run upon any public highway outside the limits of a city, fire district or thickly settled or business part of a town at a speed exceeding fifteen miles an hour, or at that rate for any part of an hour, and no such vehicle shall be run upon any public way within the limits of a city, fire district or any thickly settled or business part of a town at a speed exceeding eight miles an hour or at that rate for any part of an hour.

Section 5. The term "public way" in this act shall include all private ways owned or used in common whenever an owner or user of such private way shall file with said commission a notice claiming the protection of this act.

Section 6. The term "automobile" in this act shall include all vehicles propelled by any power other than muscular power, excepting railroad and railway cars and motor vehicles running only upon rails or tracks.

Section 7. Any person operating or causing to be operated any automobile upon a public way for which a license has not been obtained from the highway commission as aforesaid or is not in force, and any person operating, or any employer permitting an employee to operate, any automobile without having a license from said commission to operate automobiles shall be punished for each offence by a fine of one hundred dollars or by imprisonment for a term of ten days, or by both such fine and imprisonment, and for one year after such conviction no license shall be issued for such automobile or the owners thereof, or to such operator, or to any employee of such owner.

Section 8. Any person violating any of the speed restrictions herein set forth shall be punished for each offence by a fine not exceeding two hundred dollars or by imprisonment for a term not exceeding ten days, or by both such fine and imprisonment, and upon conviction of a second offence the said commission shall, upon production of a certificate from the clerk of the court in which such conviction is had or upon other satisfactory evidence, suspend the license of automobile, owner and operator, and upon conviction of a third offence shall revoke the licenses of automobile, owner and operator, and no new licenses shall be issued to any of them.

Section 9. The fee for each license shall be ten dollars to be applied by the chairman of the said commission to clerk hire, the pay of inspectors and other expenses, the balance if any to be paid at the end of each year to the Commonwealth.

Section 10. Sections one and seven of this act shall not apply to automobiles or the owners or operators thereof in transit to or from any show, fair or track or other ground upon which automobiles can be legally raced where such automobile is to be raced or exhibited.

Section 11. Section one of chapter three hundred and fifteen of the acts of the year nineteen hundred and two is hereby repealed.

Section 12. This act shall take effect upon its passage.

THE MASSACHUSETTS A. C. BILL.

Of the other measures introduced, that of the Massachusetts Automobile Club calls for a speed-limit of twenty miles per hour on country roads, and twelve miles in cities, local restrictions and regulations to be repealed except in the case of park authorities, who are to be continued in their power to make park regulations of their own. This bill also calls for reasonable and proper care on the part of motorists running through thoroughfares where other vehicles are present, requires good and sufficient brakes, with bell, horn, or other signal device, requires one or more lamps to be lighted between one hour after sunset and one hour before sunrise, giving light in the direction in which the vehicle is progressing; requires the owner's initials in letters three inches high on the back and both sides of the vehicle; provides that the motorists shall not be required to obtain a license or permit from local authorities or those in charge of the highways, public streets, bridges, or other public thoroughfares, and places the maximum fine for offenses against its provisions at twenty-five dollars.

A shorter bill also was proposed by the Automobile Club, making the same speed provisions, and in a second section forbidding a city or town to require less than twelve miles per hour in thickly inhabited districts while allowing to park authorities full power in making regulation against the automobile.

Another bill came from the Boston Automobile Dealers' Association. It would fix the speed limit at twenty miles on country roads, twelve miles in cities, with a further cut to eight miles in crowded business districts. It also would concede a requirement for lamps lighted at night, legible designation of each auto by means of figures or initials, and in addition would provide for registration of every car on the part of the State. The dealers held that State registration was a fair requirement in order that it might be possible to identify any machine on which the numbers or initials could be made out; but the dealers are strongly opposed to any license requirement.

Although all the bills have not been properly docketed yet, and it is therefore impossible to tell exactly what each provides, it is said that another bill has been filed this year which will, if passed, make things easier for any motorist who may have the misfortune to be arrested on a Saturday or a Sunday. It is said that the bill bears no special automobile earmark, but that it is aimed to make a loophole in legal procedure so that a man arrested for speeding on the days mentioned may not be put into a cell until court opens on the following Monday.

NOT ALL HARMONY HERE.

It may seem strange to those outside the State that the motorists as a body are not found backing one particular bill. The fact is, that all is not as harmonious as it might be between the local club and the local dealers' association. As long ago as October and November the club had a law committee at work preparing for the legislative fight which was

known to be impending. This committee wanted to see the dealers organized in order that they might be in a better position to assist in the work. Either at the suggestion of the committee after one of the private dinners held about that time, at which the club members and dealers' representatives talked the situation over together, or on their own initiative, the dealers organized the association noted in this paper at the time, and negotiations were started looking to the drafting of a bill. The club had engaged counsel, meanwhile, and one or two lawyers opened rooms in the name of the club as headquarters for legislative work in a downtown hotel. This move was regarded with disfavor by the dealers, and there came a hitch in proceedings. Certain club members, on the other hand, felt that the dealers were out of sympathy and were being held back by certain leaders who had personal reasons for not wishing to join with the club actively in the proceedings before the legislature. As a result the breach became chronic and the dealers soon after engaged counsel of their own, and deciding to work independently (although on the same lines as to legislative provisions as the club), sent over to New York to confer with Secretary Butler, of the Automobile Club of America, and at the last moment prepared their own bill. They stated that they did not wish to run counter to the club, but merely wished to be certain that a bill such as they wanted should be filed. They secured for counsel ex-Judge Henry S. Dewey, whose decisions, in a number of local automobile cases while he was on the bench, attracted attention in the Boston district. The club had engaged Mr. Boardman Hall, who had as assistant Mr. Robert Clement, an attorney who argued the bills before the committee in the automobile legislative war of 1902.

NEW ASSOCIATION AND SHOW.

This division of interests would hardly be of importance, perhaps, if the whole matter did not appear to be closely related to another move in motoring circles which came out on Saturday as a great surprise. This was the news of the formation, by men prominent in the Massachusetts Automobile Club, of a brand-new automobile organization, whose immediate object is the conduct of an automobile show in Mechanics' Building, this city, in the week of February 23. This show will forestall the show for which the Dealers' Association has been making arrangements for the last three weeks to be held in Symphony Hall in the week of March 16, and the question at once arises as to why it should be thought worth while to start a second show ahead of the one originally planned. True, the scope is somewhat different, for the February show is to have an exhibition floor on which brake tests, tests of control and stunts will be performed, and there may be a series of obstacle races; but as exhibitions, the shows will, of course, be practically similar.

The new organization is to be incorporated under the title of the New England Automobile Association. It is aimed to promote the interests of automobile owners, users and makers all over New England, also to conduct shows in the principal cities in succeeding years and to manage races in the principal cities. It has no sanction from the National Association, and will work by itself, so the promoters state. Among the incorporators are President James T. Soutter, of the Massachusetts Automobile Club; Dr. F. L. D. Rust, its secretary; Eliot C. Lee, Frederick Tudor, Jr., and Newton Crane, all members; Edward H. Clement, of the Boston *Transcript*, and John A. Curtin.

This plan is to establish automobile association headquarters in the principal cities, so that members may find accommodations for their machines wherever they may happen to be. They also plan to take a hand in legislative matters concerning the automobile, and will be represented at the hearing on the bills now filed in Massachusetts. So far, they have secured the co-operation of no other clubs in the New England district, but will look for an individual membership. The plan may work up to a union of clubs later. In their conduct of the proposed show they say that several spaces have been engaged already, that club members will show their machines, that dealers will be invited to exhibit, and that the principal aim of the show will be educative.

FIGHT EXPECTED IN CONNECTICUT LEGISLATURE OVER WARREN BILLS.

Special Correspondence.

NEW HAVEN, Conn., January 26.—With the present winter the Connecticut Legislature has come in for its biennial session. As Connecticut is the roadway between New York and Boston for automobilists, as the farming community in the State which has no appreciation for automobiles is a fairly large one, and as the "small towns," i. e., the country towns, control legislation in this State, the legislation concerning the automobile here will bear watching by lovers of the sport.

In a general way it may be said that there are enough owners of automobiles in this State to take care of any especially ridiculous legislation against these machines, but it will be the part of wisdom for clubmen generally, who expect to make use of this State, to scrutinize the new legislation proposed rather carefully. There are several weeks yet before the time limit for the introduction of new business will expire.

Two bills have made their appearance thus far, both introduced by Representative J. R. Warren, a farmer and schoolmaster, who is the Assemblyman from Lyme. Lyme is a country town on the east bank of the mouth of the Connecticut River. Through its southern border runs the New Haven-New London turnpike, which is much used by autoists. The people of Lyme have conceived a desire, it appears, to confine these autoists to travel on this road, and incidentally to shut them out of the romantic back roads in that delightfully wild back region of the town known as the "Devil's Hop Yard," as well as in other quarters that are equally interesting. Hence the introduction of the following extraordinary bill in the General Assembly at Hartford, by Mr. Warren, last week:

"Section 1. No automobile, locomobile, electric carriage or horseless vehicle of any description shall run over any country road except the main thoroughfare through the town, whether the direction be from east to west or north to south.

"Section 2. The selectmen of the several towns shall direct the course of any horseless vehicles by placing a guide board at the forks and four corners bordering on the thoroughfare leading through such towns.

"Section 3. Any person violating section first of this act shall be fined not less than $50 nor more than $100."

Now, it would not be supposed that there would be any danger of such an arbitrary and one-sided bill as this being considered, but it is stated that the bill is one that has already received the cordial indorsement of many of the farmer members of the Assembly, and that there will be an effort made to enact legislation based upon this bill.

The matter has been referred to the Committee on Public Health and Safety.

Another measure, which Mr. Warren has introduced at the present session of the General Assembly, proposes to substitute a maximum speed of eight miles per hour for automobiles, for the reasonable maximum of fifteen miles per hour which is now enjoyed. The bill applies to country roads, and a penalty of not less than $50 nor more than $100 is provided for each violation of the law.

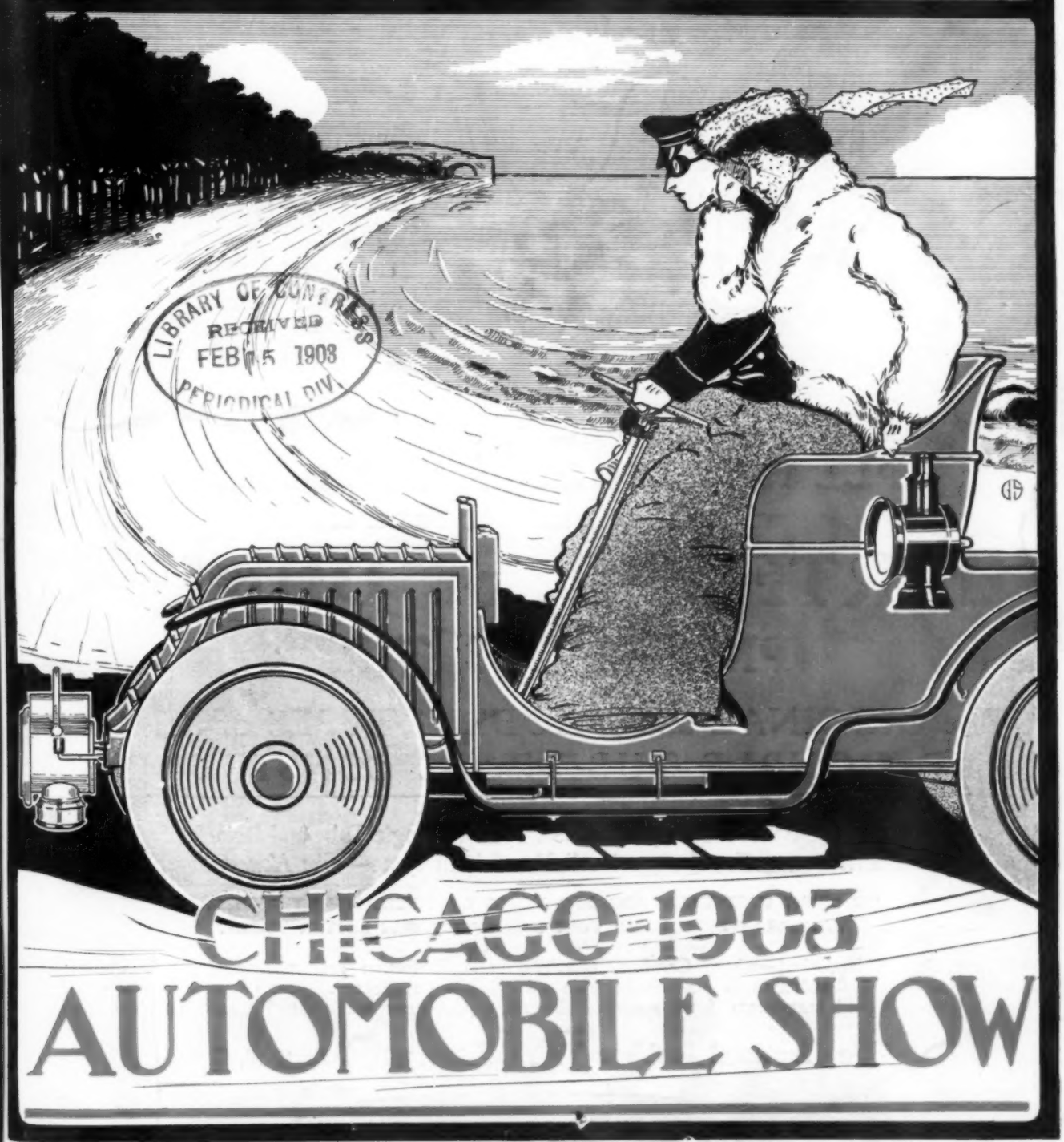
There is no doubt that this bill will be killed. At the same time it is "up to" automobile clubmen to look after just this sort of legislation in the old Nutmeg State, as the farmers have the greatest number of votes in the General Assembly.

Other bills fully as unnecessary as the above will undoubtedly be introduced before the time limit for them has expired.

August Dietz, the much arrested and fined chauffeur of W. D. Guthrie, of Glen Cove, L. I., was again in collision on February 1, his car striking the buggy of James Norton, Jr., from the rear. A warrant for his arrest has been issued.

An ordinance regulating the speed of automobiles in Baltimore is now under consideration by the city authorities

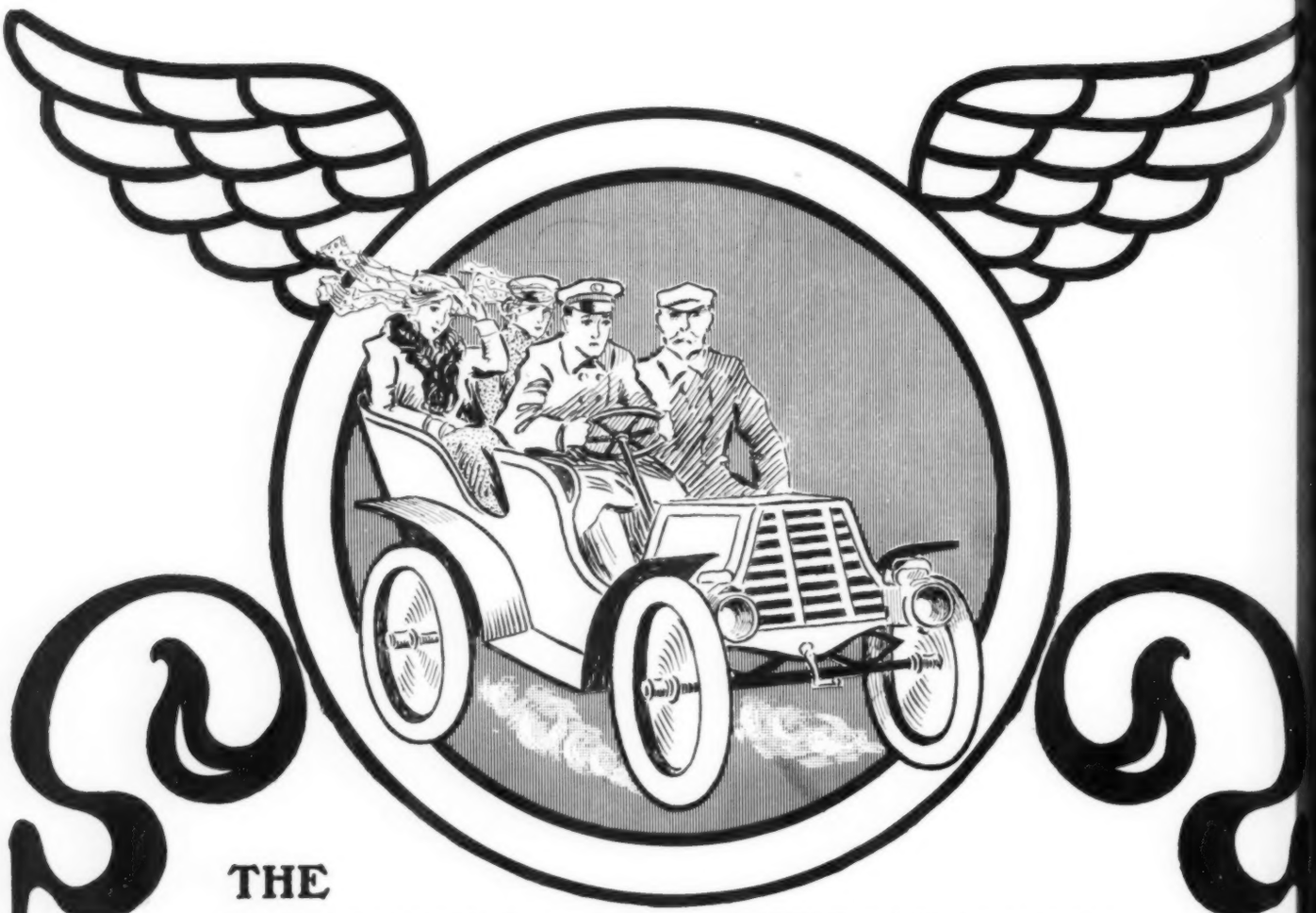
THE AUTOMOBILE



CHICAGO 1903 AUTOMOBILE SHOW

FEBRUARY 14, 1903

10 CENTS A COPY



THE PLEASURES OF AUTOMOBILING

WILL BE GREATLY ENHANCED BY THE USE OF

HARTFORD or DUNLOP

PNEUMATIC TIRES

The ORIGINAL and "MODEL" TYPES of SINGLE AND DOUBLE TUBE TIRE CONSTRUCTION

Appreciating the fact that requirements vary as to Single Tube and Detachable Tire Construction, we offer the most reliable of both types—*The Honest Standards.*

THEY WERE BEST YEARS AGO. AND YEARS OF INTELLIGENTLY PERSISTENT, CAREFULLY DIRECTED EFFORT HAS MADE THEM BETTER TO-DAY.

Where Quality is desired—where Comfort, Durability, and Protection against Annoyances is wanted—where All-'round Satisfaction is demanded—these tires should be adopted. Let us prove this to you by sending you signed statements from some of the most prominent makers and users in this country.

The Hartford Rubber Works Company, Hartford, Conn.